

IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

**FEDERAL AID IN FISH RESTORATION
Job Performance Report
Project F-71-R-15**



REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 2-a.	Region 2 Mountain Lakes Investigations
Job No. 2-b.	Region 2 Lowland Lakes Investigations
Job No. 2-c.	Region 2 Rivers and Streams Investigations
Job No. 2-d.	Region 2 Technical Guidance

By

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JOB PERFORMANCE REPORT

State of: Idaho

Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project: F-71-R-15

Title: Region 2 Mountain Lake
Investigations

Subproject: 2-a

Period Covered: July 1, 1990 to June 30, 1991

ABSTRACT

One hundred ninety lakes were surveyed in a 4-year, high lake cooperative project between the U.S. Forest Service and the Idaho Department of Fish and Game. Forty-one percent of the lakes surveyed were included in the Regional Stocking Program. As a result of the surveys, 8 were eliminated from stocking and 38 are being monitored to determine level of natural production.

Twenty-one lakes were surveyed by conservation officers and volunteers during 1990.

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OBJECTIVES

1. Evaluate the success of the mountain lake stocking program in Region 2.
2. Modify stocking rate or species to produce better condition fish and higher quality fishery where necessary.
3. Collect lake specific fish and fisheries-related survey information upon which to base management decisions.
4. Discontinue stocking lakes where habitat is suitable to maintain a self-supporting population of fish and provide angler harvest.
5. Develop standardized data collection forms and methods for professional and volunteer lake surveys (Appendix A).

METHODS

Lake surveys performed in the High Lake Fisheries Project (1986-1990) used methodology developed and techniques described in A Survey Methodology for High Mountain Lakes, Bahls, 1989.

We used information gathered by conservation officers to provide a cursory check of management practices.

Additional catch data was provided by voluntary returns of census forms which were distributed to anglers who made inquiries at the regional office regarding mountain lake fishing.

RESULTS

The Idaho Department of Fish and Game and the U.S. Forest Service, Nez Perce Forest, co-funded a comprehensive mountain lake survey program from 1986 through 1990. In the four field seasons, 190 lakes were surveyed for physical, chemical, and biological characteristics. The High Lake Fishery Project yielded comprehensive lake survey information, in journal form, and survey methodology for mountain lakes.

Forty-one percent of the lakes in the 190-lake survey fall into the current stocking program. Of the 78 lakes being stocked, 8 (10%) were eliminated. Of the remaining 70 lakes, 32 (46%) were recommended stockable. The remaining 38 lakes (64%) are to be resurveyed to determine if the level of natural reproduction is sufficient to sustain a fishable population.

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The remaining 112 lakes in the survey (59%) **are** not being stocked. Of the lakes not being stocked, 61 (54.4%) have self-sustaining populations of fish. The remaining 51 lakes are barren.

Results of individual volunteer and officer lake surveys as well as management recommendations are included in Appendix D.

RECOMMENDATIONS

1. Expand lake survey work to the Clearwater National Forest.
2. Follow stocking schedule and number of fish as modified following survey findings (Appendix B).
3. Resurvey lakes where stocking was postponed to determine level of reproduction.
4. Use organized volunteer anglers for resurvey work.
5. Computerize all mountain lake data, angler reports, stocking records, and survey findings, in a database program for quick retrieval and manipulation.
6. Lake-specific recommendations are listed in Appendix D.

LITERATURE CITED

Bahls, P. 1989. A survey methodology for high mountain lakes. High Lake Fisheries Project for Nez Perce National Forest, Grangeville, Idaho, and Idaho Department of Fish and Game, Boise, Idaho.

A P P E N D I C E S

Appendix A.

Idaho Fish and Game
Mountain Lake Survey Form

Lake Name: _____ Date: ____/____/____
IDFG Catalog #: ____:____:____:____:____ EPA #: _____
Major Drainage _____ Minor Drainage: _____
County: _____ Region: _____
USFS Ranger Dist: _____ Wilderness Area: _____
Section: ____ Township: ____ Range: ____ Elevation: _____ feet

PHYSICAL:

Lake Type: ____ 1.cirque 2.moraine 3.slump 4.caldera 5.beaver
Total Surface Area: ____ Hectares
Depth profile: _____ Aspect: _____
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth _____ meters 4. Lake has west facing exposure
Average Depth _____ meters 5. Lake is exposed in all directions

Chemical

Alkalinity _____ mg/l Ph _____
Conductance _____ umho/cm² @ 25C Temp (surface) _____. C
Secchi depth _____. meters Temp (bottom) _____. C

Spawning Potential

Inlet(s) _____ (number) Outlet(s) _____ (number)
Length accessible for spawning _____ meters Length accessible for spawning _____
Inlet spawning suitability: ____ Outlet spawning suitability: ____
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning population)
3. fair (not adequate to maintain population)
4. poor (not suitable for successful spawning)

USE

Campsites _____ (number) Fire pits _____ (number) Litter L M H
Trail around lake: ____ complete ____ partial, trampled: YES NO
Access: ____ good trail ____ poor trail ____ cross country

BIOLOGICAL

Zooplankton Composition and Density

Genera Identified	% of sample	Size	Density (o/l)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix A. Continued.

Insect Composition and Abundance

Aquatic Genera	relative abundance			Terrestrial Genera	abundance		
	L	M	H		L	M	H

Fish Survey

Fishermen _____ (numbers) Hours fished _____ (total)
 Fish caught _____ Fish / hour _____ Abundance L M H

Length Frequency

Species	Total Length in mm								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
Total									

Fish Condition

Species	Total Length (mm)		Weight (g)		Condition (K)	
	mean	range	mean	range	mean	range

Stocking History

Year	Species	Number of Fish	Comments

COMMENTS:

Appendix B.

Idaho Fish and Game
Volunteer
Mountain Lake Survey Form

Lake Name: _____ Date: ____/____/____
 IDFG Catalog #: ____:____:____:____:____ EPA #: _____
 Major Drainage _____ Minor Drainage: _____
 County: _____ Region: _____
 USFS Ranger Dist: _____ Wilderness Area: _____
 Section: ____ Township: ____ Range: ____ Elevation _____ (feet)

USE

Campsites ____ (number) Fire pits ____ (number) Litter L M H
 Trail around lake: ____ complete ____ partial, trampled: YES NO
 Access: ____ good trail ____ poor trail ____ cross country

BIOLOGICAL

Fish Survey

Fishermen _____ (numbers) Hours fished _____ (total)
 Fish caught _____ Fish / hour _____ Fish Abundance L M H

Length Frequency

Species	Total Length in mm (inches)								
	0-49 (1-2)	50-99 (2-4)	100-149 (4-6)	150-199 (6-8)	200-249 (8-10)	250-299 (10-12)	300-349 (12-14)	350-399 (14-16)	400+ (16+)

Total

Stocking History

Year	Species	Number of Fish	Comments

COMMENTS:

Appendix C.

IDAHO FISH AND GAME
 REGION 2
 MOUNTAIN LAKE FRY REQUESTS
 FOR YEARS: 1991, 1994, 1997

IDFG CATALOG #	LAKE NAME	SP	NUMBER STOCKED BY YEAR			MGMT CLASS	LOCATION			USFSRD	COMMENTS
			1991	1994	1997		S	T	R		
06/00/00/0144	BLACK MTN. (JUG)	C2	1000	1000	1000		23	41	7	CANYON	
06/00/00/0150	MALLARD	C2	1000	1000	1000		36	42	7	CANYON	
06/00/00/0155	POT	R4	500	500	500		12	39	8	PIERCE	
06/00/00/0158	ROCKY RIDGE	C2	1000	1000	1000		20	38	8	PIERCE	
06/00/00/0160	JUNCTION	C2	1000	1000	(000		36	39	9	N. FORK	
06/00/00/0169	MONROE	C2	1000	1000	1000		16	37	10	N. FORK	
06/00/00/0178	KELLY	C2	1000	1000	1000		32	40	13	N. FORK	
06/00/00/0179	KID	C2	1000	1000	1000		27	40	13	N. FORK	
06/00/00/0180	LEO	C2	1000	1000	1000		12	39	13	N. FORK	
06/00/00/0182	SMOKEY	C2	1000	1000	1000		12	39	13	N. FORK	
06/00/00/0183	RING	C2	1000	1000	1000		35	40	9	N. FORK	
06/00/00/0184	PETE OTT	C2	1000	1000	1000		26	40	9	N. FORK	
06/00/00/0186	ELIZABETH LAKE	C2	1000	1000	1000		24	40	9	N. FORK	
06/00/00/0187	TILLIE	C2	1000	1000	1000		24	40	9	N. FORK	
06/00/00/0189	FITIF	C2	1000	1000	1000		24	40	9	N. FORK	
06/00/00/0192	ICE	C2	1000	1000	1000		26	40	9	N. FORK	
06/00/00/0201	COPPER	C2	750	750	750		36	42	9	N. FORK	
06/00/00/0205	SILVER	C2	2500	2500	2500		36	42	9	N. FORK	
06/00/00/0211	FIRE LAKE	R4	1000	1000	1000		34	33	8	LOCHSA	
06/00/00/0226	FLORENCE LAKE	C2	0	1000	1000		28	33	10	LOCHSA	SURVEY IN 1991
06/00/00/0229	MAUDE	R4	0	1000	1000		19	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0231	EAST MAUDE	R4	0	500	500		30	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0237	MUD LAKE	C2	0	1000	1000		29	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0240	SURPRISE CR. #2	C2	0	1000	1000		28	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0241	SURPRISE CR. #3	R4	0	1000	1000		29	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0242	SURPRISE CR. #4	C2	0	1000	1000		29	34	10	LOCHSA	SURVEY IN 1991
06/00/00/0253	POST OFFICE LOWER	C2	2000	2000	2000		19	37	12	POWELL	
06/00/00/0254	POST OFFICE UPPER	C2	2000	2000	2000		19	37	12	POWELL	
06/00/00/0274	SIAN LAKE	C2	1000	1000	1000		26	37	16	POWELL	
06/00/00/0322	MOORE	C2	1000	1000	1000		33	38	16	POWELL	
06/00/00/0323	RUDD	C2	1000	1000	1000		33	38	16	POWELL	
06/00/00/0327	BEAVER #2	C2	1000	1000	1000		10	37	16	POWELL	
06/00/00/0329	SPRUCE NORTH	C2	1000	1000	1000		1	37	16	POWELL	
06/00/00/0330	SPRUCE SOUTH	C2	1000	1000	1000		12	37	16	POWELL	
06/00/00/0333	MOOSE	R4	1000	1000	1000		30	38	17	POWELL	
06/00/00/0340	WILLIAMS	C2	1000	1000	1000		11	38	13	POWELL	
06/00/00/0393	SHASTA	R4	1000	1000	1000	IV A	34	34	10	MOOSE CR.	
06/00/00/0397	LONE LAKE (N)	C2	1000	1000	1000	IV B	2	33	10	MOOSE CR.	
06/00/00/0403	LIZARD #3	C2	0	500	500	H A	12	33	10	MOOSE CR.	SURVEY IN 1993
06/00/00/0404	LIZARD #4	C2	0	500	500	H A	12	33	10	MOOSE CR.	SURVEY IN 1993
06/00/00/0592	GOLD PAN	C2	1000	1000	1000		26	27	13	W. FORK	
06/00/00/0600	THREE LAKE CR.#5	C2	1000	1000	1000		3	26	13	W. FORK	
06/00/00/0602	THREE LAKE CR.#6	C2	500	500	5(X)		3	26	13	W. FORK	
06/00/00/0606	SWET LAKE	C2	1000	1000	1000		11	25	13	W. FORK	
06/00/00/0607	THIRTEEN WI	C2	1000	1000	1000		4	25	14	W. FORK	
06/00/00/0608	THIRTEEN #2	R4	1000	1000	1000		5	25	14	W. FORK	
06/00/00/0610	LAKE CR. LAKE	C2	1000	1000	1000		9	25	14	W. FORK	
06/00/00/0611	STRIPE CR. #1	C2	1000	1000	1000		17	25	14	W. FORK	
06/00/00/0612	STRIPE CR. #2	C2	1000	(000	1000		17	25	14	W. FORK	
06/00/00/0613	STRIPE CR. #3	C2	1000	1000	1000		8	25	14	W. FORK	
06/00/00/0614	STRIPE CR.#4	C2	1000	1000	1000		8	25	14	W. FORK	
TOTALS			44250	51750	51750						

Appendix C. Continued.

IDAHO FISH AND GAME
 REGION 2
 MOUNTAIN LAKE FRY REQUESTS FOR
 YEARS: 1992, 1995, 1998

IDFG CATALOG #	LAKE NAME	SP	NUMBER STOCKED BY YEAR			MGMT CLASS	LOCATION			USFSRD	COMMENTS
			1992	1995	1998		S	T	R		
N/A	SLIDE ROCK	C2	0	500	500	II A	34	23	2W	SLATE CR	SURVEY IN 1994
N/A	PURGATORY	C2	0	500	500	IV B	23	23	2W	SLATE CR	SURVEY IN 1994
05/00/00/0102	BASIN (MAIN)	C2	0	500	500	II A	11	23	2W	SLATE CR	SURVEY IN 1994
05/00/00/0107	GEM	C2	0	500	500	V	14	23	2W	SLATE CR	SURVEY IN 1994
05/00/00/0111	SHEEP CREEK #4	C2	0	500	50(1	V	14	23	2W	SLATE CR	SURVEY IN 1994
05/00/00/0112	BERNARD #1	R4	500	500	500	IV B	3	23	2W	SLATE CR	
05/00/00/0114	BERNARD #2	C2	500	500	500	IV B	3	23	2W	SLATE CR	
05/00/00/0117	ECHO	C2	500	500	500	IV B	15	23	2W	SLATE CR	
05/00/00/0118	HEDEVIL	R4	500	500	500	IV B	22	23	2W	SLATE CR	
05/00/00/0119	TRIANGLE	C2	500	500	500	IV A	22	23	2W	SLATE CR	
05/00/00/0120	QUAD	C2	500	500	500	IV A	22	23	2W	SLATE CR	
05/00/00/0122	BALDY (MAIN)	R4	1000	1000	1000	IV A	22	23	2W	SLATE CR	
06/00/00/0160	HUNGRY LAKE	C2	2000	200	2000		36	35	13	POWELL	
36/00/00/0287	COLT CR #6	C2	1000	1000	1000		4	35	14	POWELL	
06/00/00/0306	DUCK LAKE	C2	1000	1000	1000		3	34	15	POWELL	
06/00/00/0317	PARACHUTE LAKE	C2	2000	2000	2WO		35	36	16	POWELL	
06/00/00/0318	GARNET LAKE	C2	1000	1000	1000		36	36	16	POWELL	
06/00/00/0320	WHITE SAND	R4	1000	1000	1000		23	36	16	POWELL	
06/00/00/0434	PORPHYRY NORTH	C2	1000	1000	1000		5	34	14	POWELL	
06/00/00/0435	PORPHYRY LAKE	C2	1000	1000	1000		7	34	14	POWELL	
06/00/00/0446	GOAT (N)	C2	0	500	500	II A	29	34	15	MOOSE CR	SURVEY IN 1994
06/00/00/0447	GOAT (S)	C2	0	500	500	V	30	34	15	MOOSE CR	SURVEY IN 1994
06/00/00/0449	JEANETTE LAKE	C2	1000	1000	1000		9	34	15	POWELL	
06/00/00/0468	SID LAKE	C2	500	500	500	IV B	10	32	14	MOOSE CR	
06/00/00/0480	EMERALD #3	C2	0	500	500	V	5	30	15	MOOSE CR	SURVEY IN 1994
06/00/00/0481	BILL'S #4	C2	0	500	500	V	4	30	15	MOOSE CR	SURVEY IN 1994
06/00/00/0490	CUB	C2	0	500	500	V	20	31	16	MOOSE CR	SURVEY IN 1994
06/00/00/0533	CANYON CREEK #5	C2	1000	1000	1000		16	29	16	W. FORK	
06/00/00/0540	CANYON CREEK #11	C2	1000	1000	1000		11	29	16	W. FORK	
06/00/00/0543	CANYON CREEK #13	C2	2000	2000	2000		12	29	16	W. FORK	
06/00/00/0546	CANYON CR. #16	C2	1000	1000	1000		36	30	16	W. FORK	
06/00/00/0570	WHITE CAP #34	C2	(000	1000	1000		28	31	16	W. FORK	
06/00/00/0575	TRIPLE (N)	C2	1000	1000	1000		10	30	16	W. FORK	
06/00/00/0576	TRIPLE (W)	C2	1000	1000	1000		10	30	16	W. FORK	
06/00/0010578	TRIPLE (5)	C2	1000	1000	1000		14	30	16	W. FORK	
06/00/00/0580	WHITE CAP (N)	C2	1000	1000	1000		22	30	16	W. FORK	
06/00/00/0581	WHITE CAP (W)	C2	1000	1000	1000		28	30	16	W. FORK	
06/00/00/0582	WHITE CAP (S)	C2	1000	1000	1000		27	30	16	W. FORK	
07/00/00/0114	MIRROR	C2	0	500	500	V	13	23	2W	SLATE CR	SURVEY IN 1994
07/00/0010115	CANNON, LOWER	C2	500	503	500	IV B	19	23	1 W	SLATE CR	
07/00/00/0117	CANNON, UPPER	C2	500	500	500	IV B	24	23	2W	SLATE CR	
07/00/00/0118	HANSON, LOWER	C2	0	500	500	V	24	23	2W	SLATE CR	SURVEY IN 1994
07/00/00/0120	HANSON, UPPER	C2	500	500	500	IV B	24	23	2W	SLATE CR	
07/00/00/0122	DOG	C2	0	500	500	B A	35	23	2W	SLATE CR	SURVEY IN 1994
07/00/00/0127	HORSE HEAVEN #4	C2	0	500	500	II A	35	23	2W	SLATE CR	SURVEY IN 1994
	TOTALS		29000	36000	36000						

Appendix C. Continued.

IDAHO FISH AND GAME
REGION 2
MOUNTAIN LAKE FRY REQUESTS
FOR YEARS: 1993, 1996, 1999

IDFG CATALOG #	LAKE NAME	SP	NUMBER STOCKED BY YEAR			MGMT CLASS	LOCATION			USFSRD	COMMENTS
			199 3	1996	1999		S	T	R		
06/00/00/0586	BURNT KNOB LOWER	C2	1000	1000	1000		4	27	12	W. FORK	
06/00/00/0589	BURNT KNOB UPPER	C2	1000	1000	1000		4	27	12	W. FORK	
06/00/00/0620	EAST GOSPEL	C2	500	500	500	IV B	34	27	4	SLATE CR	
06/00/00/0621	LOWER KNOB	C2	0	500	500	V	35	27	4	SLATE CR	SURVEY IN 1995
06/00/00/0630	LOST (SYLVIA)	C2	1000	1000	1000	IV B	32	28	6	ELK CITY	
06100/00/0632	TWENTY MILE	C2	0	1000	1000	V	5	27	6	ELK CITY	SURVEY IN 1995
06/00/00/0635	LOWER WISEBOY	C2	500	500	500	IV B	34	27	6	ELK CITY	
06/00/00/0637	UPPER WISEBOY	C2	0	500	500	V	34	27	6	ELK CITY	SURVEY IN 1995
06/00/000640	MIRROR	C2	1000	1000	1000	IV B	3	26	6	ELK CITY	SURVEY IN 1995
070000/0106	SLATE W2	C2	500	500	500	IV B	15	26	4	SLATE CR	
07/ 0/00/0107	NUT BASIN	R4	1000	1000	1000	IV B	1	25	2	SLATE CR	
07/00/00/0234	EMERALD	C2	0	1000	1000	V	35	26	4	SLATE CR	SURVEY IN 1995
07/00/00/0239	SHINDIG	C2	0	500	500	V	28	26	6	RED RIVER	SURVEY IN 1995
07/00/00/0254	OREGON BUTTE	C2	500	500	500	IV B	12	25	6	RED RIVER	
07/00/00/0255	BRANDON CR #1	C2	0	500	500	II A	9	25	6	RED RIVER	SURVEY IN 1995
0700000258	BEAR	R4	0	500	500	V				RED RIVER	SURVEY IN 1995
07/00/00/0258	BEAR	C2	0	500	500	V	13	26	6	RED RIVER	SURVEY IN 1995
07/00/00/0259	CRESCENT	C2	500	500	500	IV A	13	26	6	RED RIVER	
07/00000263	ROUND	C2	0	500	500	II A	35	26	6	RED RIVER	SURVEY IN 1995
0700000264	DEER	C2	500	500	500	IV B	35	26	6	RED RIVER	
07/00/00/0267	SQUARE	C2	500	500	500	IV B	7	26	7	RED RIVER	
0700000268	FAWN	C2	500	500	500	IV B	6	25	7	RED RIVER	
0700/00/0269	WILDHORSE	C2	0	1000	1000	II B	30	27	7	RED RIVER	SURVEY IN 1995
0700000270	KELLY #1	C2	0	500	500	II A	25	27	6	RED RIVER	SURVEY IN 1995
0700000273	KELLY M2	C2	0	500	500	V	26	27	6	RED RIVER	SURVEY IN 1995
0700/000274	KELLY #4	C2	500	500	500	IV B	26	27	6	RED RIVER	
07/00/00/0277	HUMP BUFFALO	C2	1000	1000	1000	IV B	2	27	6	RED RIVER	
07/00/000279	WEST SHEEPHILL	C2	500	500	500	IV B	16	26	11	RED RIVER	
0700/00/0283	LAKE CR #2	C2	500	500	500	IV B	11	26	11	RED RIVER	
070000/0284	LAKE CR #3	C2	500	1000	1000	IV B	11	26	11	RED RIVER	
0700000287	STILLMAN	C2	0	500	500	V	5	27	12	RED RIVER	SURVEY IN 1995
07/00000288	MCARTHUR	C2	0	500	500	III B	33	28	12	RED RIVER	SURVEY IN 1995
07/00/00/0290	RATTLESNAKE	C2	0	500	500	V	15	26	11	RED RIVER	SURVEY IN 1995
0700000293	EAST SHEEPHILL	C2	500	500	500	IV B	15	26	11	RED RIVER	
07/00000294	CENTER CR XI	C2	1000	1000	1000	IV A	24	26	11	RED RIVER	
0700000295	CENTER CR #2	C2	0	500	500	V	24	26	11	RED RIVER	SURVEY IN 1995
070000/0300	BROWN CR	C2	0	500	500	II A	18	26	11	RED RIVER	SURVEY IN 1995
0700/00/0304	SADDLE CR	C2	0	500	500	V	6	26	11	RED RIVER	SURVEY IN 1995
070000/0304	SADDLE CR	R4	0	500	500	V	6	26	12	RED RIVER	SURVEY IN 1995
0700/00/0305	SPREAD POINT	C2	0	1000	1000	U A	29	27	12	RED RIVER	SURVEY IN 1995
07/0000/0307	TRILBY #1	C2	0	500	500	V	29	27	12	RED RIVER	SURVEY IN 1995
07/00/00/0308	TRILBY M2	C2	0	500	500	II A	20	27	12	RED RIVER	SURVEY IN 1995
07/0000/0309	TRILBY #3	C2	0	500	500	V	20	27	12	RED RIVER	SURVEY IN 1995
	TOTALS		13500	27500	27500						

Appendix D. Mountain lake surveys.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: BATTLE, MAIN

DRAINAGE: EF MOOSE CR.

sec tnshp rng

CATALOG #: 06/00/00/0429

LOCATION: 9 33N 15E

SIZE (Acre): 35.4

ELEVATION (msl): 6625

SURVEY BY: VOL

SURVEY DATE: 1990

PRIMARY SPECIES: RB

SECONDARY SPECIES:

ABUNDANCE: LOW

SIZE RANGE: 14 INCHES

HOURS FISHED: 1

OF ANGLERS: 1

CATCH RATE: 1 (fish/hr)

SPAWNING POTENTIAL:

AMOUNT OF USE:

USFS RANGER DIST: MOOSE CR.

STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1986	R4	1000
1983	R1	789
1981	RB	920
1978	RB	1500

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey showed abundance of fish has been reduced considerably since stocking was discontinued following the 1986 plant. Main Battle Lake is a large, deep oligotrophic lake.

Recommend stocking commence again in 1992 on a 3-year rotation utilizing 500 rainbow trout per stocking.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: DOE DRAINAGE: MINK CREEK
CATALOG #: 06/00/00/0359 LOCATION: sec tnshp rng
21 31N 11E
SIZE (Acre): 10.8 ELEVATION (msl): 6705
SURVEY BY: 208 SURVEY DATE: 9/14/90
PRIMARY SPECIES: BK SECONDARY SPECIES: N/A
ABUNDANCE: HIGH SIZE RANGE: 6 TO 8 INCHES
HOURS FISHED: N/A # OF ANGLERS: 2
CATCH RATE: N/A (fish/hr) SPAWNING POTENTIAL: HIGH
AMOUNT OF USE: LOW USFS RANGER DIST: MOOSE CR.
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
N/A		

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Stunted brook trout population. Doe lake is large and deep and may be a good candidate for introduction of bull trout as a predator.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: INDIAN DRAINAGE: PETTIBONE CR.
sec tnshp rng
CATALOG #: 06/00/00/0469 LOCATION: 3 32N 14E
SIZE (Acre): 18.9 ELEVATION (msl): 6130
SURVEY BY: VOL SURVEY DATE: 1990
PRIMARY SPECIES: CT SECONDARY SPECIES:
ABUNDANCE: SIZE RANGE:
HOURS FISHED: # OF ANGLERS:
CATCH RATE: 0 (fish/hr) SPAWNING POTENTIAL:
AMOUNT OF USE: USFS RANGER DIST:
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
NONE		

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey reports no fish caught but numerous fish seen jumping. Comprehensive survey in 1986 indicated a naturally reproducing population of westslope cutthroat trout. There is no previous record of stocking in Indian Lake. The population is assumed to be native.

No change in management is recommended at this time. Indian Lake is a potential source of pure-strain westslope broodstock.

MOUNTAIN LAKE SURVEY

Region 2

LAKE: LOTTIE DRAINAGE: OLD MAN CR.
CATALOG #: 06/00/00/0235 LOCATION: sec tns h rng 19 34N 10E
SIZE (Acre): ELEVATION (msl): 6170
SURVEY BY: VOL SURVEY DATE: 8/12/90
PRIMARY SPECIES: N/A SECONDARY SPECIES:
ABUNDANCE: LOW SIZE RANGE: N/A
HOURS FISHED: 1 ,1E OF ANGLERS: 2
CATCH RATE: 0 (fish/hr) SPAWNING POTENTIAL:
AMOUNT OF USE: MODERATE USFS RANGER DIST:
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
NONE		

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Lottie lake is noted in the planting catalog as having naturally-reproducing brook trout. Survey comments stated frequent moose use at Lottie Lake was keeping the lake murky.

Recommend resurvey with gill net for population status to determine stocking suitability.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: MONROE DRAINAGE: CAYUSE CR.
sec tnshp rng
CATALOG #: 06/00/00/0169 LOCATION: 16 37N 10E
SIZE (Acre): ELEVATION (msl):
SURVEY BY: VOL SURVEY DATE: 8/3/90
PRIMARY SPECIES: CT SECONDARY SPECIES:
ABUNDANCE: HIGH SIZE RANGE: 9 TO 10 INCHES
HOURS FISHED: 4 # OF ANGLERS: 1
CATCH RATE: 12.5 (fish/hr) SPAWNING POTENTIAL:
AMOUNT OF USE: LIGHT USFS RANGER DIST: NORTH FORK
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1988	C2	1000
1985	C2	1000
1982	C3	999
1980	RC	1000

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Scheduled for stocking of 1000 C2 in 1991, 1994 and 1997.

LAKE: NORTH LONE	DRAINAGE: RHODA CR.
CATALOG #: 06/00/00/0397	LOCATION: 2 <u>sec</u> <u>tnsh</u> <u>rng</u> 33N 10E
SIZE (Acre): 13.5	ELEVATION (msl): 6380
SURVEY BY: VOL	SURVEY DATE: 8/14/90
PRIMARY SPECIES: N/A	SECONDARY SPECIES:
ABUNDANCE: N/A	SIZE RANGE: N/A
HOURS FISHED: .2	# OF ANGLERS: 1
CATCH RATE: 0 (fish/hr)	SPAWNING POTENTIAL:
AMOUNT OF USE: MODERATE	USFS RANGER DIST: MOOSE CR.
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1988	C2	1000
1985	C2	996
1982	C3	1272
1980	RC	750

Survey reports fish seen rising but none caught. Comprehensive survey done in 1986 indicates high angling pressure may be limiting fishery potential.

Scheduled for stocking 1000 C2 in 1991, 1994 and 1997.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: SOUTH LONE	DRAINAGE: RHODA CR.
	<u>sec</u> <u>tnshp</u> <u>rng</u>
CATALOG #: 06/00/00/0399	LOCATION: 11 33N 10E
SIZE (Acre): 11.3	ELEVATION (msl): 6500
SURVEY BY: VOL	SURVEY DATE: 8/14/90
PRIMARY SPECIES: RB	SECONDARY SPECIES:
ABUNDANCE: MEDIUM	SIZE RANGE: 6 TO 14 INCHES
HOURS FISHED: .5	# OF ANGLERS: 1
CATCH RATE: 6 (fish/hr)	SPAWNING POTENTIAL: HIGH
AMOUNT OF USE: LOW	USFS RANGER DIST: MOOSE CR.
STOCKING HISTORY:	

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1988	C2	1000
1985	C2	996
1982	C3	1272
1980	RC	750

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey shows rainbow trout being caught and cutthroat trout being stocked. Comprehensive survey in 1986 showed high potential for natural reproduction. Rainbow trout in 1990 survey could be hybrids.

Stocking in South Lone Lake has been postponed indefinitely.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: NORTH PARK	DRAINAGE: BEAR CR.
CATALOG #: 06/00/00/0494	LOCATION: <u>sec</u> <u>tnshp</u> <u>rng</u> 30 33N 15E
SIZE (Acre): 15.1	ELEVATION (msl): 6765
SURVEY BY: VOL	SURVEY DATE: 1990
PRIMARY SPECIES: RB	SECONDARY SPECIES:
ABUNDANCE: MEDIUM	SIZE RANGE: 12 TO 14 INCHES
HOURS FISHED: N/A	0 OF ANGLERS: 1
CATCH RATE: N/A (fish/hr)	SPAWNING POTENTIAL: LOW
AMOUNT OF USE:	USFS RANGER DIST: MOOSE CR.
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1986	C2	1000
1983	R1	789
1981	RB	920
1978	RB	1500

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

North Park Lake has had stocking postponed since 1986 to determine if there is suitable natural reproduction to maintain a fishable population. No cutthroat were seen in the 1990 survey. The last planting of rainbow was made in 1983. Survey sample of rainbow 12 to 14 inches could be age 6+, but is unlikely.

Recommend continuing stocking postponement and schedule resurvey for 1994.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: Red DRAINAGE: MEADOW CREEK
sec tnshp rng
CATALOG #: 06/00/00/0351 LOCATION: 4 30 11
SIZE (Acre): 6.1 ELEVATION (msl): 6566
SURVEY BY: 208 SURVEY DATE: 9/14/90
PRIMARY SPECIES: BK SECONDARY SPECIES: N/A
ABUNDANCE: MEDIUM SIZE RANGE: 6 TO 10 INCHES
HOURS FISHED: N/A i OF ANGLERS: 2
CATCH RATE: N/A (fish/hr) SPAWNING POTENTIAL: HIGH
AMOUNT OF USE: MODERATE USFS RANGER DIST. MOOSE CR.
STOCKING HISTORY:

YEAR	SPECIES	NUMBER
N/A		

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Stunted brook trout lake. No stocking required.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: SECTION 30 DRAINAGE: OLD MAN CR.
CATALOG #: 06/00/00/0227 LOCATION: 33 sec tnshp rng 34N 10E
SIZE (Acre): ELEVATION (msl):
SURVEY BY: VOL SURVEY DATE: 8/12/90
PRIMARY SPECIES: N/A SECONDARY SPECIES:
ABUNDANCE: LOW SIZE RANGE: N/A
HOURS FISHED: .5 # OF ANGLERS: 1
CATCH RATE: 0 (fish/hr) SPAWNING POTENTIAL: N/A
AMOUNT OF USE: MODERATE USFS RANGER DIST:
STOCKING HISTORY:

YEAR _____ SPECIES _____ NUMBER
NONE

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey for potential stocking.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: SID DRAINAGE: PETTIBONE CR.
sec tnshp rng
CATALOG #: 06/00/00/0468 LOCATION: 10 32N 15E
SIZE (Acre): 4.5 ELEVATION (msl): 6300
SURVEY BY: VOL SURVEY DATE: 1990
PRIMARY SPECIES: RB SECONDARY SPECIES:
ABUNDANCE: MEDIUM SIZE RANGE: 12 INCHES
HOURS FISHED: 1 0 OF ANGLERS: 1
CATCH RATE: 1 (fish/hr) SPAWNING POTENTIAL:
AMOUNT OF USE: USFS RANGER DIST: MOC3E CR.
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1988	R1	1000
1985	R4	990
1982	R1	453
1980	RB	600

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey states area around lake was severely burned in natural wildfire. Comprehensive survey in 1986 indicated stocking was necessary to maintain fishable population. Rainbow trout were feeding predominately on snails and tasted muddy.

Recommended to switch from rainbow to cutthroat as species stocked. Reduce number stocked to 500. Schedule stocking for 1992, 1995, 1998.

LAKE: SURPRISE CR. #3	DRAINAGE: BOULDER CR.
	<u>sec tnshp rng</u>
CATALOG #: 06/00/00/0241	LOCATION: 28 34N 10E
SIZE (Acre):	ELEVATION (msl): 6400+
SURVEY BY: VOL	SURVEY DATE: 8/13/90
PRIMARY SPECIES: RB	SECONDARY SPECIES:
ABUNDANCE: MEDIUM	SIZE RANGE: 4 TO 14 INCHES
HOURS FISHED: 1	# OF ANGLERS: 2
CATCH RATE: 1 (fish/hr)	SPAWNING POTENTIAL:
AMOUNT OF USE: LIGHT	USFS RANGER DIST: LOCHSA
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1988	R1	1000
1985	R4	990
1982	R1	737
1980	RB	600
1974	RB	1750

The current stocking program is apparently providing the fishery in Surprise Cr. #3. Stocking rate may need to be reduced. Scheduled 1991 stocking is being curtailed to allow comprehensive survey work including natural reproductive potential. Survey will be done in 1991.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: SURPRISE CR. #4

DRAINAGE: BOULDER CR.

sec tnshp rng

CATALOG #: 06/00/00/0242

LOCATION: 28 34N 10E

SIZE (Acre):

ELEVATION (msl): 6400 EST

SURVEY BY: VOL

SURVEY DATE: 8/13/90

PRIMARY SPECIES: RB

SECONDARY SPECIES: CT

ABUNDANCE: MEDIUM

SIZE RANGE: 6 TO 12 INCHES

HOURS FISHED: 2.5

OF ANGLERS: 5

CATCH RATE: 3.6 (fish/hr)

SPAWNING POTENTIAL:

AMOUNT OF USE: HIGH

USFS RANGER DIST: LOCHSA

STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1988	C2	1000
1985	C2	996
1982	C3	585
1980	RC	1000
1974	CT	1176

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey states some anglers may have had problems with rainbow/cutthroat differentiation. However, presence of rainbow may indicate drift from Surprise Cr. #3 (upstream). Stocking in 1991 will be curtailed to allow comprehensive survey to determine natural reproductive potential. Survey will be done in 1991.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: WALTON N. DRAINAGE: WHITE SANDS CR.
CATALOG #: 06/00/00/0266 LOCATION: sec tnshp rng 28 36N 14E
SIZE (Acre): 20+ ELEVATION (msl):
SURVEY BY: VOL SURVEY DATE: 8/26/90
PRIMARY SPECIES: CT SECONDARY SPECIES:
ABUNDANCE: HIGH SIZE RANGE: 2 TO 10 INCHES
HOURS FISHED: 6 # OF ANGLERS: 3
CATCH RATE: 3 (fish/hr) SPAWNING POTENTIAL: HIGH
AMOUNT OF USE: LOW USFS RANCER DIST POWELL
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
NONE		

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

North Walton Lake has a self-sustaining population of cutthroat trout.
The lake is not being stocked.

No change in management is necessary at this time.

LAKE: BUCK	DRAINAGE: MEADOW CREEK
CATALOG #: 06/00/00/0349	LOCATION: <u>sec</u> 32 <u>tnshp</u> 31N <u>rng</u> 11E
SIZE (Acre): 4.5	ELEVATION (msl): 7011
SURVEY BY: 208	SURVEY DATE: 9/14/90
PRIMARY SPECIES: NONE	SECONDARY SPECIES: NONE
ABUNDANCE: N/A	SIZE RANGE: N/A
HOURS FISHED: 1	# OF ANGLERS: 2
CATCH RATE: 0 (fish/hr)	SPAWNING POTENTIAL: LOW
AMOUNT OF USE: MODERATE	USFS RANGER DIST: MOOSE CR.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: HEATHER DRAINAGE: NF CLEARWATER
sec tnshp rnq
CATALOG #: 06/00/00/0206 LOCATION: 30 42N 10E
SIZE (Acre): ELEVATION (msl):
SURVEY BY: VOL SURVEY DATE: 8/15/90
PRIMARY SPECIES: BK SECONDARY SPECIES:
ABUNDANCE: LOW SIZE RANGE: 10 TO 12 INCHES
HOURS FISHED: 1 # OF ANGLERS: 2
CATCH RATE: .5 (fish/hr) SPAWNING POTENTIAL:
AMOUNT OF USE: USFS RANGER DIST: NOPTH FORK
STOCKING HISTORY:

YEAR _____ SPECIES _____ NUMBER _____
NONE

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Survey reports lake is fished out.

Recommend resurvey with gill net to determine population status of brook trout and suitability for future stocking.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: MAUDE DRAINAGE: OLD MAN CR.
sec tnshp rng
CATALOG #: 06/00/00/0231 LOCATION: 30 34N 10E
SIZE (Acre): ELEVATION (msl): 6193
SURVEY BY: VOL SURVEY DATE: 8/12/90
PRIMARY SPECIES: UNKN SECONDARY SPECIES: N/A
ABUNDANCE: LOW SIZE RANGE: 6 TO 8 INCHES
HOURS FISHED: 4 # OF ANGLERS: 3
CATCH RATE: .25 (fish/hr) SPAWNING POTENTIAL: N/A
AMOUNT OF USE: MODERATE USFS RANGER DIST: LOCHSA
STOCKING HISTORY:

<u>YEAR</u>	<u>SPECIES</u>	<u>NUMBER</u>
1990	R4	1000
1987	R4	1000
1984	R1	999
1981	RB	888
1978	RB	938

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Resurvey to determine suitability of stocking program.

MOUNTAIN LAKE SURVEY

Region 2

LAKE: MUD LAKE	DRAINAGE: BOULDER CR
	<u>sec tnshp rng</u>
CATALOG #: 06/00/00/0237	LOCATION: 29 34N 10E
SIZE (Acre):	ELEVATION (msl): 6379
SURVEY BY: VOL	SURVEY DATE: 8/13/90
PRIMARY SPECIES: N/A	SECONDARY SPECIES:
ABUNDANCE: LOW	SIZE RANGE: N/A
HOURS FISHED: .5	# OF ANGLERS: 1
CATCH RATE: 0 (fish/hr)	SPAWNING POTENTIAL:
AMOUNT OF USE: LIGHT	USFS RANGER DIST: LOCHSA
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1988	C2	1000
1985	C2	996
1982	C3	585
1980	RC	1000
1974	CT	1176

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Resurvey with gill net to determine population status and effectiveness of stocking program.

LAKE: PAPOOSE	DRAINAGE: PETTIBONE CR.
CATALOG #: 06/00/00/0467	<u>sec</u> <u>tnshp</u> <u>rng</u> LOCATION: 1 32N 13E
SIZE (Acre): 3.5	ELEVATION (msl): 6562
SURVEY BY: VOL	SURVEY DATE: 1990
PRIMARY SPECIES: BT	SECONDARY SPECIES: RB
ABUNDANCE: HIGH	SIZE RANGE: RB 8 INCHES
HOURS FISHED:	# OF ANGLERS: 1
CATCH RATE: (fish/hr)	SPAWNING POTENTIAL:
AMOUNT OF USE:	USFS RANGER DIST: MOOSE CR
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1988	R1	1000
1985	R4	990
1982	R1	453
1980	RB	600

Presence of brook trout is documented in previous survey work as well as this survey.

Stocking has been suspended indefinitely in Papoose Lake.

MOUNTAIN LAKE SURVEY
Region 2

LAKE: ROCKY RIDGE	DRAINAGE: WEITAS CR.
	<u>sec</u> <u>tnshp</u> <u>rng</u>
CATALOG #`: 06/00/00/0158	LOCATION: 20 36N 8E
SIZE (Acre):	ELEVATION (msl):
SURVEY BY: VOL	SURVEY DATE: 7/27/90
PRIMARY SPECIES: BK	SECONDARY SPECIES:
ABUNDANCE: MEDIUM	SIZE RANGE: 10 INCHES
HOURS FISHED:	1 OF ANGLERS:
CATCH RATE: (fish/hr)	SPAWNING POTENTIAL:
AMOUNT OF USE: HIGH	USFS RANGER DIST: PIERCE
STOCKING HISTORY:	

YEAR	SPECIES	NUMBER
1987	C2	1000
1980	RC	1000
1978	CT	1000
1974	CT	2000

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

Rocky Ridge Lake has a self-sustaining population of Eastern brook trout. Survey report states fair fishing for 10-inch fish.

Stocking in Rocky Ridge Lake has been postponed indefinitely.

LAKE: SEVEN LAKES #7	DRAINAGE: BOULDER CR.
	<u>sec tnshp rng</u>
CATALOG #: 06/00/00/0392	LOCATION: 29 34N 10E
SIZE (Acre): N/A	ELEVATION (msl): 6484
SURVEY BY: VOL	SURVEY DATE: 8/13/90
PRIMARY SPECIES: CT	SECONDARY SPECIES: RB
ABUNDANCE: MEDIUM	SIZE RANGE: 8 TO 10 INCHES
HOURS FISHED: 1	# OF ANGLERS: 2
CATCH RATE: 5 (fish/hr)	SPAWNING POTENTIAL: N/A
AMOUNT OF USE: LIGHT	USFS RANGER DIST: LOCHSA
STOCKING HISTORY:	

COMMENTS AND MANAGEMENT RECOMMENDATIONS:

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JOB PERFORMANCE REPORT

State of: Idaho

Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project: F-71-R-15

Title: Region 2 Lowland Lake
Investigations

Subproject: 2-b

Period Covered: July 1, 1990 to June 30, 1991

ABSTRACT

We estimated the number of largemouth bass in Winchester Lake, 200 mm and larger, at 836 fish. Proportional stock density (PSD) for the population was estimated at .19; however, age 2+ and 4+ largemouth bass were missing from the sample. Growth rates of largemouth bass in Winchester Lake are the fastest of any largemouth bass populations in Region 2 lowland lakes and are comparable to Lake Lowell and C.J. Strike Reservoirs.

We estimated the number of smallmouth bass in Waha Lake, 180 mm and larger, at 892 fish. PSD for the population was estimated at 20. Growth rates of smallmouth bass in Waha Lake are similar to other regional waters.

Author:

Ed Schriever
Regional Fisheries Biologist

OBJECTIVES

1. Assess bass populations in Winchester and Waha lakes.
2. Monitor differentially-marked spring and fall fingerling plants in Winchester Lake, Mann Lake, Spring Valley Reservoir, and Soldiers Meadow Reservoir.
3. Determine contribution to creel and size/time of recruitment to creel of different fingerling plants in lowland lakes.
4. Reduce number of catchable-size fish planted in lowland lakes that are also receiving fingerling plants but maintain management catch rate objective of .75 fish/hour.
5. Assess the status of late-spawning kokanee introduced to Soldiers Meadow Reservoir.
6. Assess the status of Lahontan cutthroat trout introduced to Elk Creek Reservoir.

METHODS

We sampled largemouth bass in Winchester Lake and smallmouth bass in Waha Lake using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 16-foot john boat. Sampling took place between 2000 hours and 0200 hours. We sampled Winchester Lake on May 10, May 14, May 29, and June 4, 1990. We sampled Waha Lake on May 8, May 16, May 31, and June 7, 1990.

We tagged stock size (largemouth = 200 mm, smallmouth = 180 mm) and larger bass with floy anchor tags. **Bass** larger than 305 mm (12 inches), the minimum legal size, were tagged with floy anchor tags offering a \$5 reward for their return. Tagging was done to eliminate recapture-caused bias in proportional stock density (PSD) estimates and to perform a multiple census mark and recapture population estimate of stock size and larger bass. Reward tags will be used to estimate angler exploitation rates.

We used Schumacher's method (Ricker 1975) for multiple census population estimates. The reciprocal of calculated $1/N$ is the population estimate N .

$$\frac{1}{N} = (M_t R_t) / (C_t M_t^2)$$

The variance is given by:

$$S^2 = \frac{(R_t/C_t) - (R_t M_t)^2 / (C_t M_t^2)}{M-1}$$

where:

C_t = total sample taken on day t
 M_t = total marked fish at large at the
start of the t^{th} day
 R_t = total recaptures on day t
 R = total recaptures
 M = total fish marked during the experiment

Age and growth estimates were made from scale analysis. Scales were taken from an area on the fish at the end of the pectoral fin extending up the side of the fish. Scales were dried and cleaned. Impressions were made in acetate slides using a heated press. Impressions were viewed on a microfiche reader. Where possible, at least 25 scales selected throughout the length distribution of each age class were read. This age distribution was applied to the total length distribution sample to produce a population age frequency.

Length at age was back-calculated using the formula:

$$L^1 = C + S^1 / S (L - C)$$

where:

S^1 = length of scale radius to annulus
 S = length of total scale radius
 L = length of fish at time of scale
collection
 L^1 = length of fish when annulus was formed

We calculated a catch curve by plotting the log of the frequency of age classes against age (Everhart and Young 1981).

We sampled trout and kokanee in lowland lakes with gill nets. We used standard floating experimental gill nets 150 feet long by 6 feet deep with six panels of different size mesh. Mesh sizes were: 3/4-inch, 1-inch, 1-1/4-inch, 2-inch, and 2-1/2-inch. Two nets were set and fished from late afternoon until early morning. Fish collected were used to determine growth rate and relative abundance of trout stocked as fingerlings and catchables and kokanee stocked as fry.

RESULTS

Winchester Lake

We collected 274 largemouth bass from Winchester Lake using electrofishing gear. Of those, 164 were 200 mm and larger (Figure 1). We tagged 147 bass ranging from 200 mm to 305 mm with non-reward floy tags. We tagged 17 bass, 305 mm and larger, with \$5 reward floy tags.

Age and Growth

The length/weight relationship for largemouth bass in Winchester Lake is described by the formula:

$$W=1.40 \times 10^{-5} (L^{2.979})$$

and is shown in Figure 2.

Length at age was back-calculated from a sample of 67 scales (Figure 3). Only one fish at age 2 and age 4 were aged from the 274 bass collected. The body scale relationship is defined by the regression equation:

$$Y = 40.6 + 1.62x \quad (n=67, r^2=.96)$$

Failure to collect age 2 and age 4 bass could have been a sampling error. However, since bass ages 1, 3, and 5 were all sampled in relative abundance (Figure 4), reproductive failure due to environmental factors should be considered as a cause of missing age classes. Length at age of bass in Winchester Lake is larger than any other lake in Region 2 (Figure 5) and is similar to bass in Idaho's Lake Lowell (Figure 6) (J. Dillon, personal communication).

Population Status

PSD for the entire sample was 10. PSD for individual sample days ranged from a low of 03 on May 14 to a high of 19 on June 4, 1990 (Figure 7). The June 4 PSD is probably the estimate that best represents the population, as vulnerability of larger bass to electrofishing gear increased with spawning behavior and activity.

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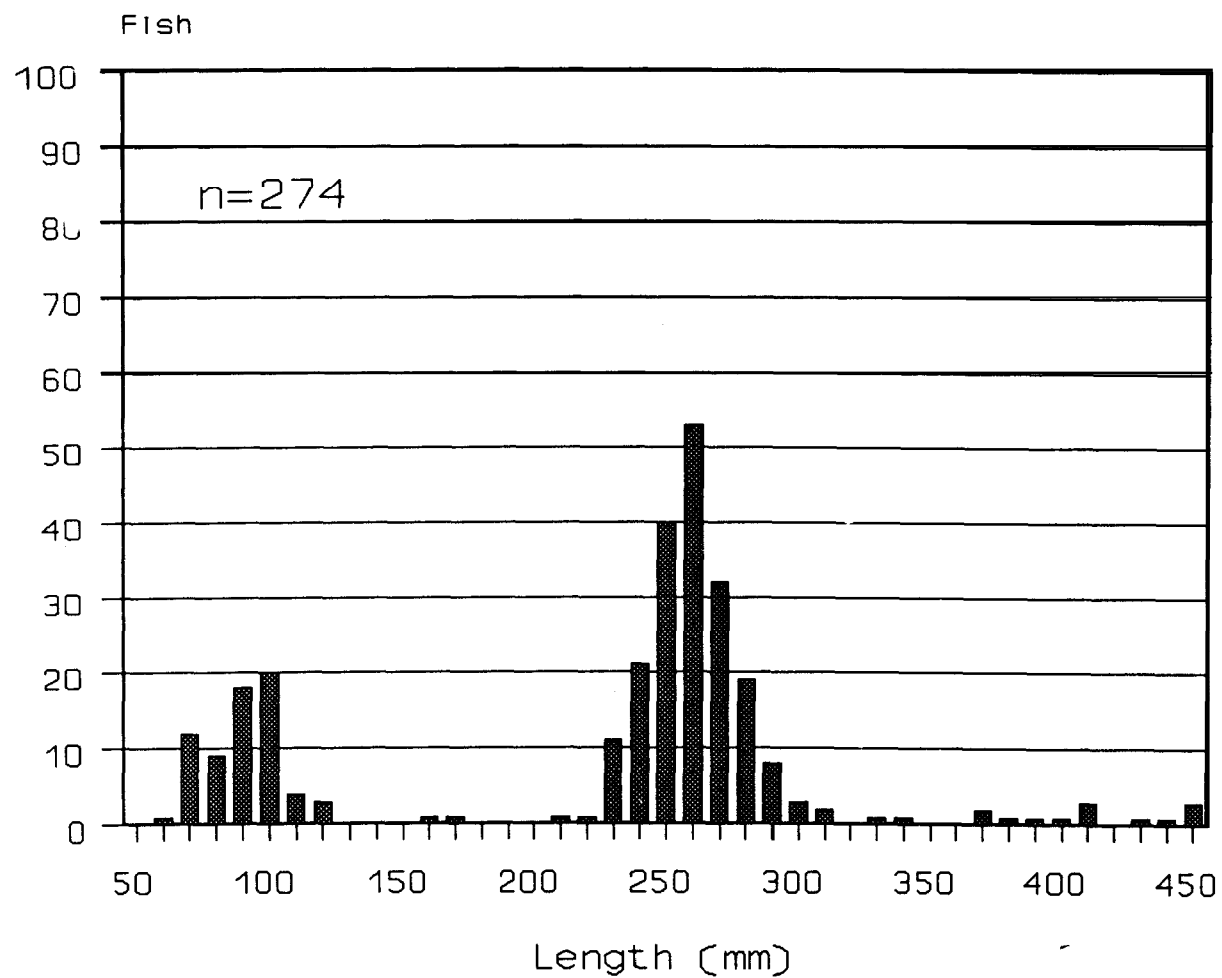
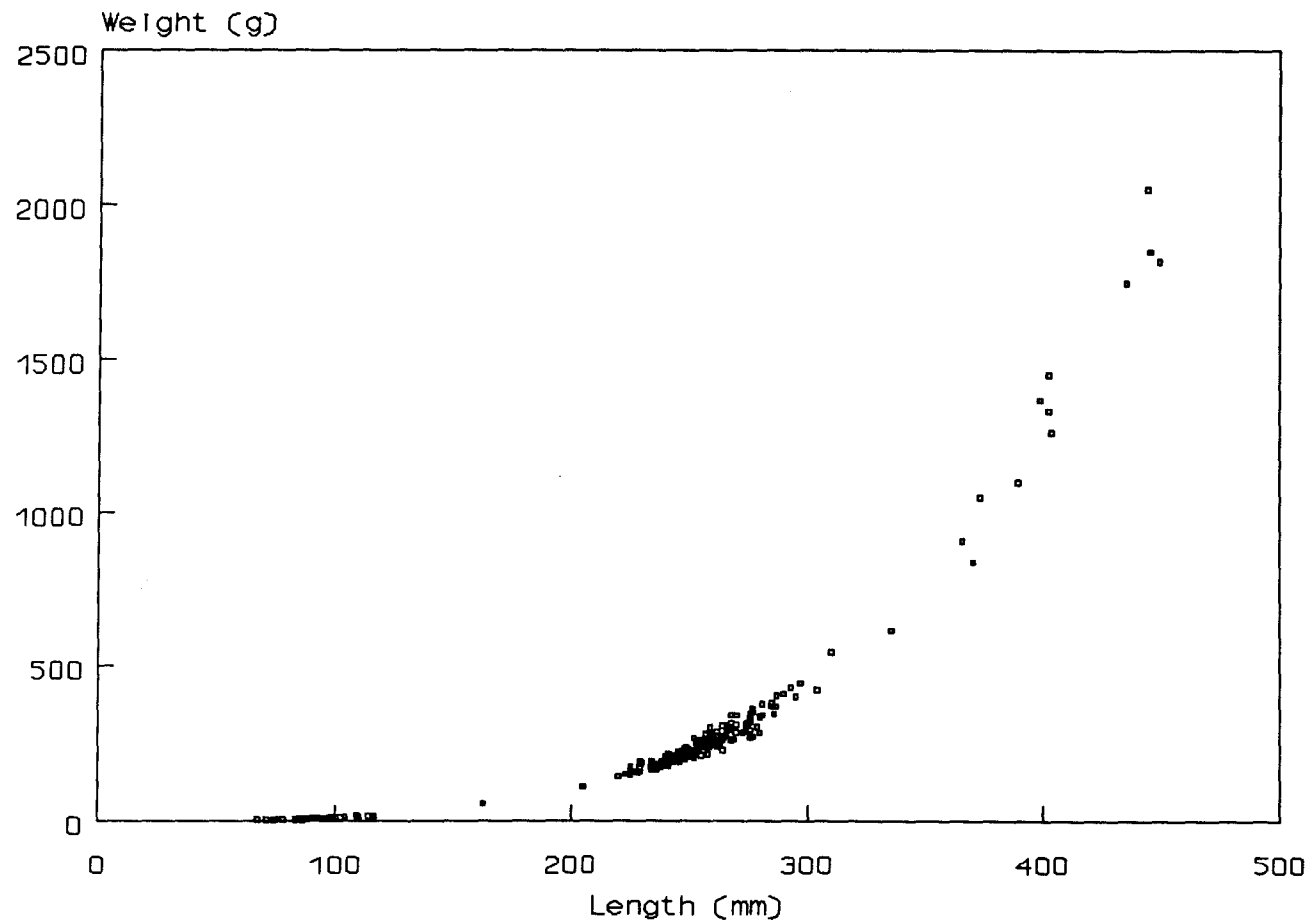
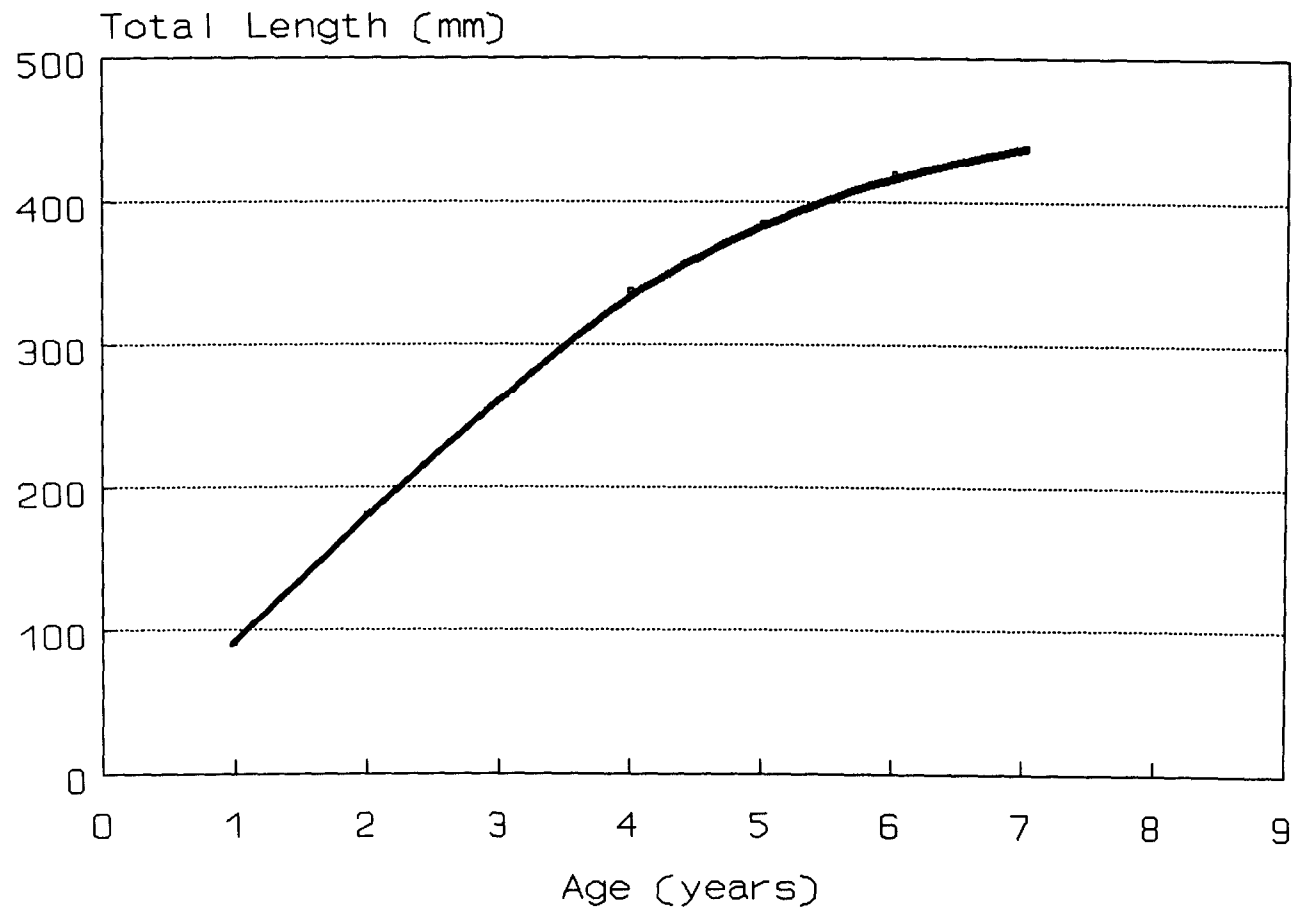


Figure 1. Length frequency of largemouth bass collected by electrofishing in Winchester Lake. Bass were collected on May 10, 14, 29, and June 4, 1990.



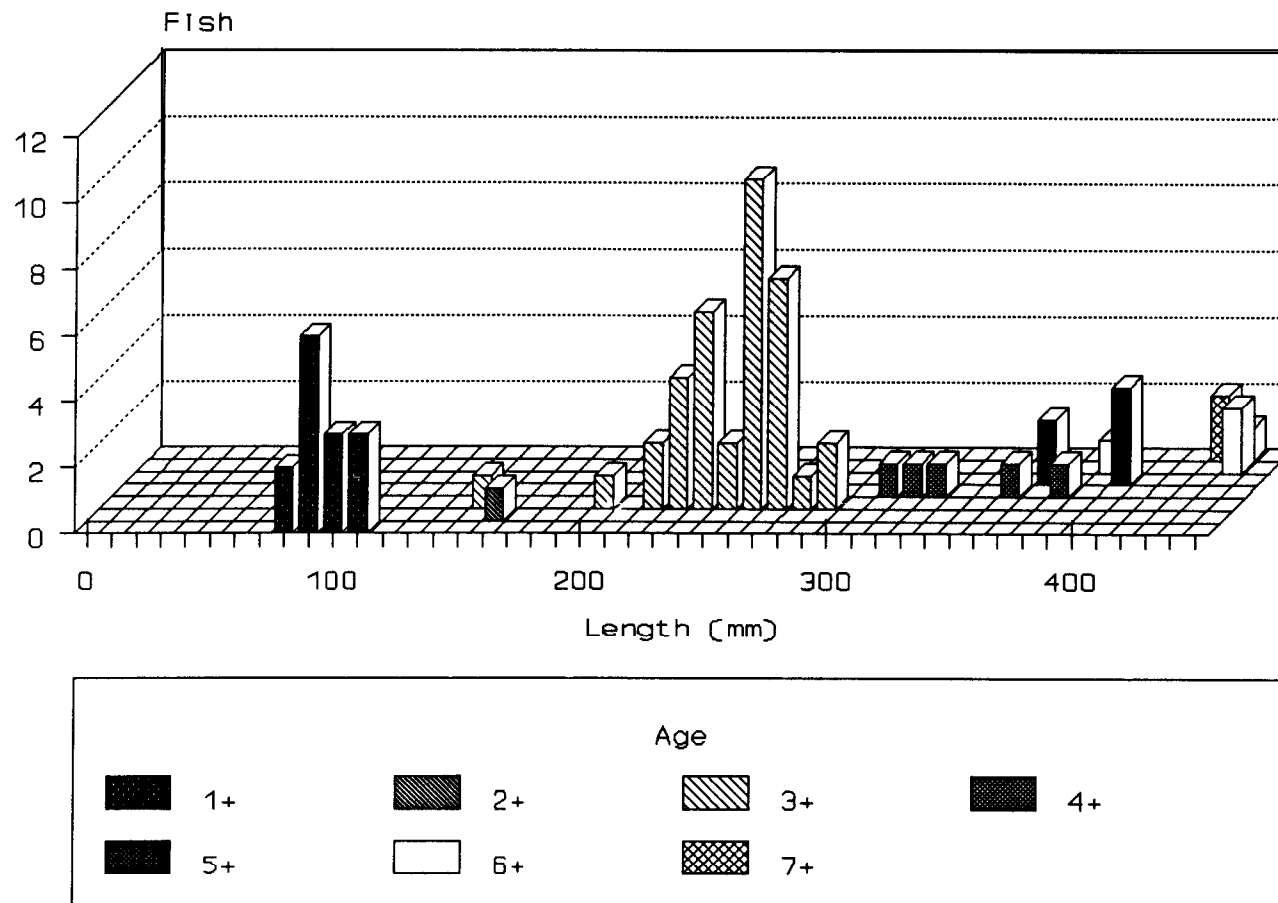
n=256

Figure 2. Length weight relationship of largemouth bass in Winchester Lake, 1990.



n=67

Figure 3. Backcalculated length at age of largemouth bass in Winchester Lake, 1990.



n=67

Figure 4. Age and size distribution of largemouth bass in Winchester Lake, 1990.

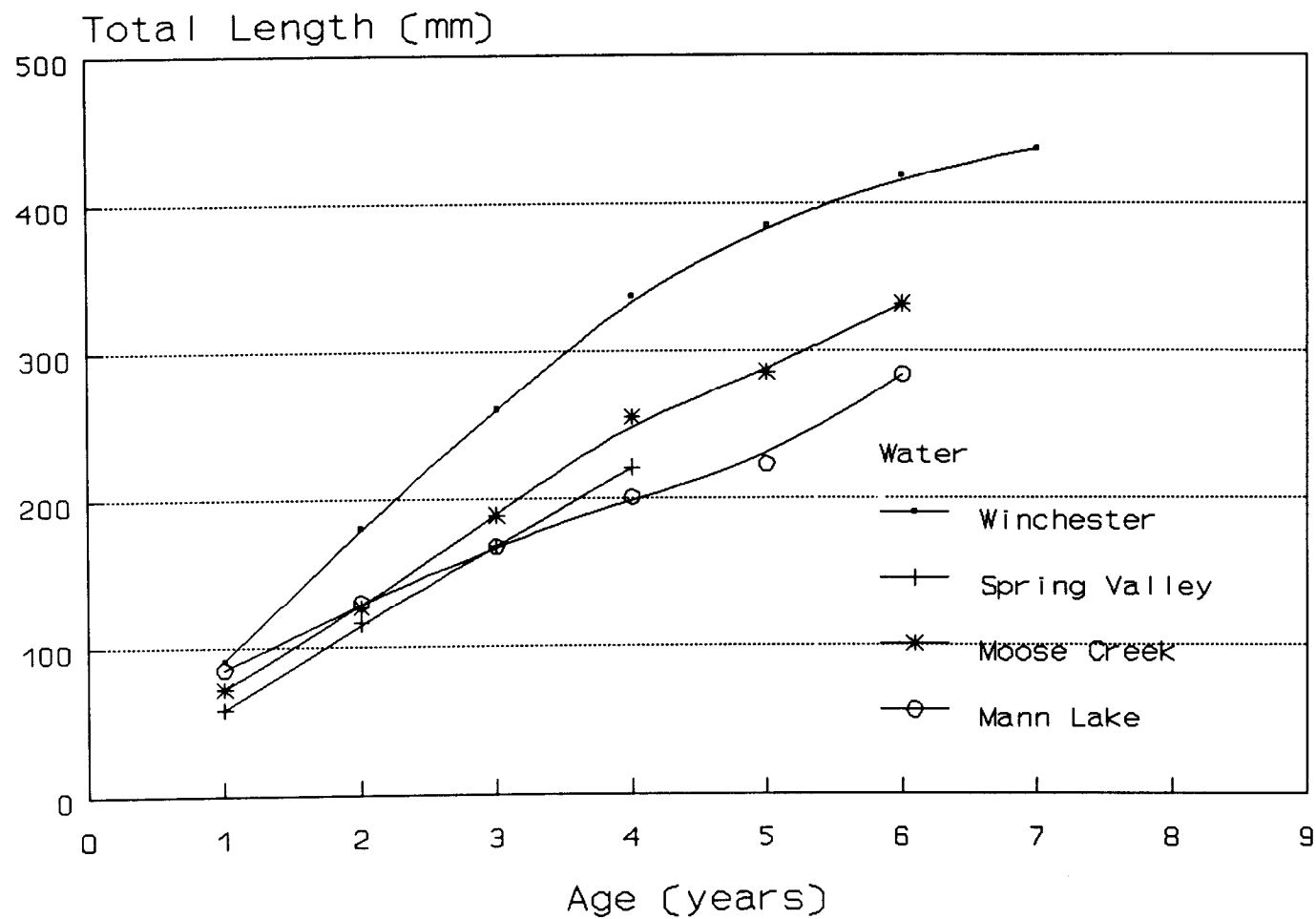


Figure 5. Comparison of backcalculated lengths at age of largemouth bass in Winchester Lake to other largemouth bass populations in Region 2.

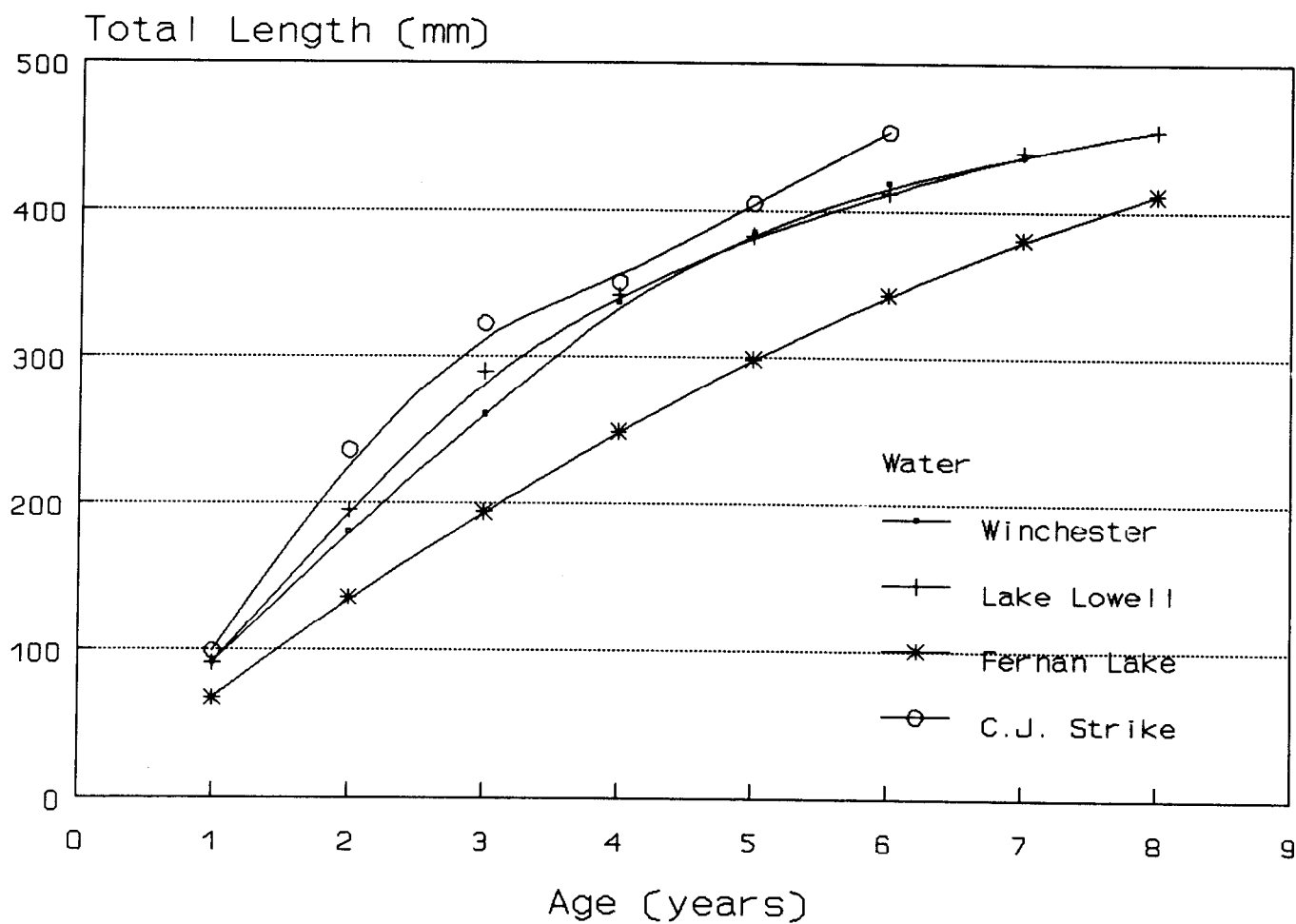


Figure 6. Comparison of backcalculated length at age of largemouth bass in Winchester Lake to other largemouth bass populations in Idaho.

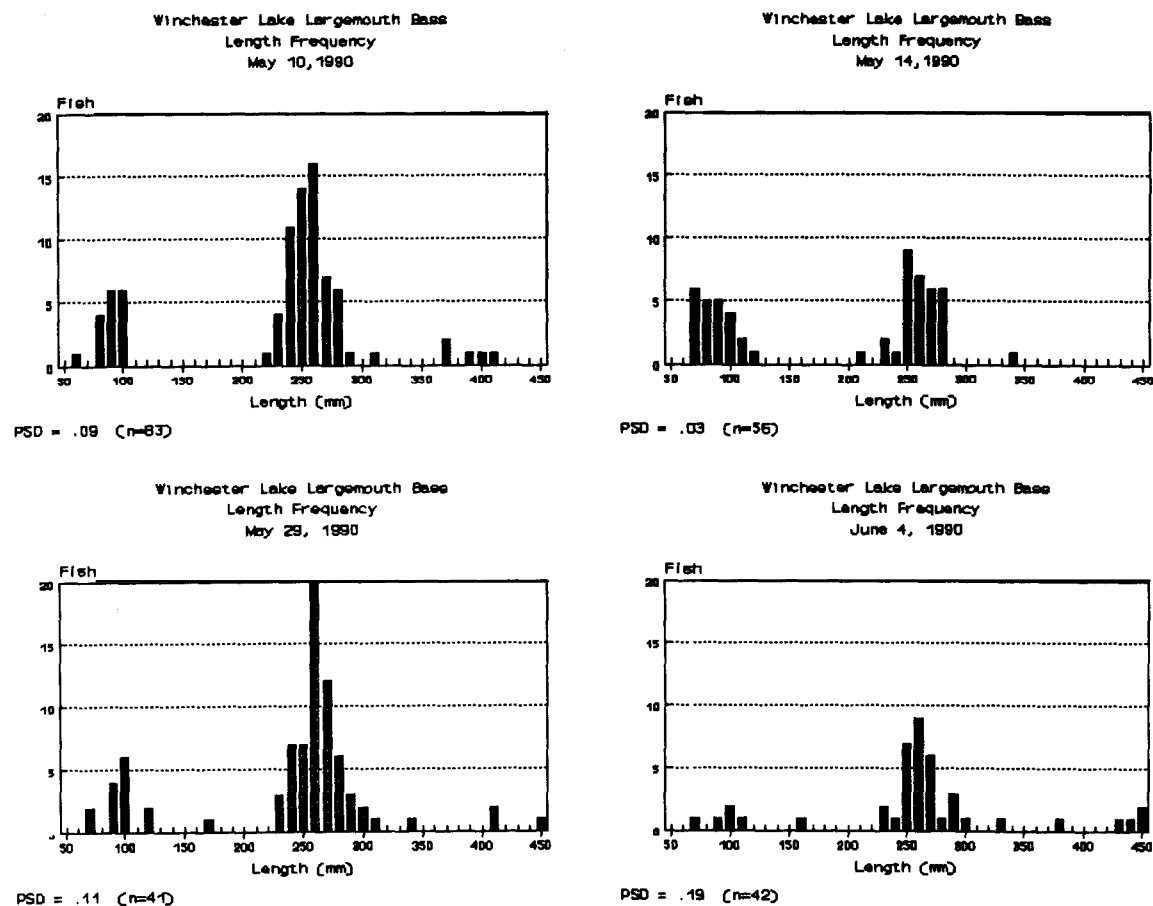


Figure 7. Length frequency distribution and proportional stock densities for different sampling days on largemouth bass in Winchester Lake, 1990.

In this case, a PSD of 19 may represent a fairly balanced population considering age 4+ fish are missing from the sample. The majority of all age 3+ fish in this population ranged from 230 mm to 300 mm in length and represented a large portion of the total population. If age 4+ fish were present at some level of expected frequency, they should be over 300 mm (from back-calculated length at age) and grouped as quality size in the PSD equation (numerator).

The population estimate of bass 200 mm and larger was 836 (95% CI = 731 ≤ N ≤ 975) (Table 1). The population estimate included stock size and larger fish and assumed that this size fish was fully recruited by the electrofishing gear. Total instantaneous mortality (Z) from a catch curve was .882 (Figure 8). Angler exploitation (E) from reward tag returns was estimated at a minimum of 12% (2/17). With a Z value of .882 and E value of .12; A = .585, S = .415, M = .70, and F = .18 (Everhart and Young, 1981).

Waha Lake

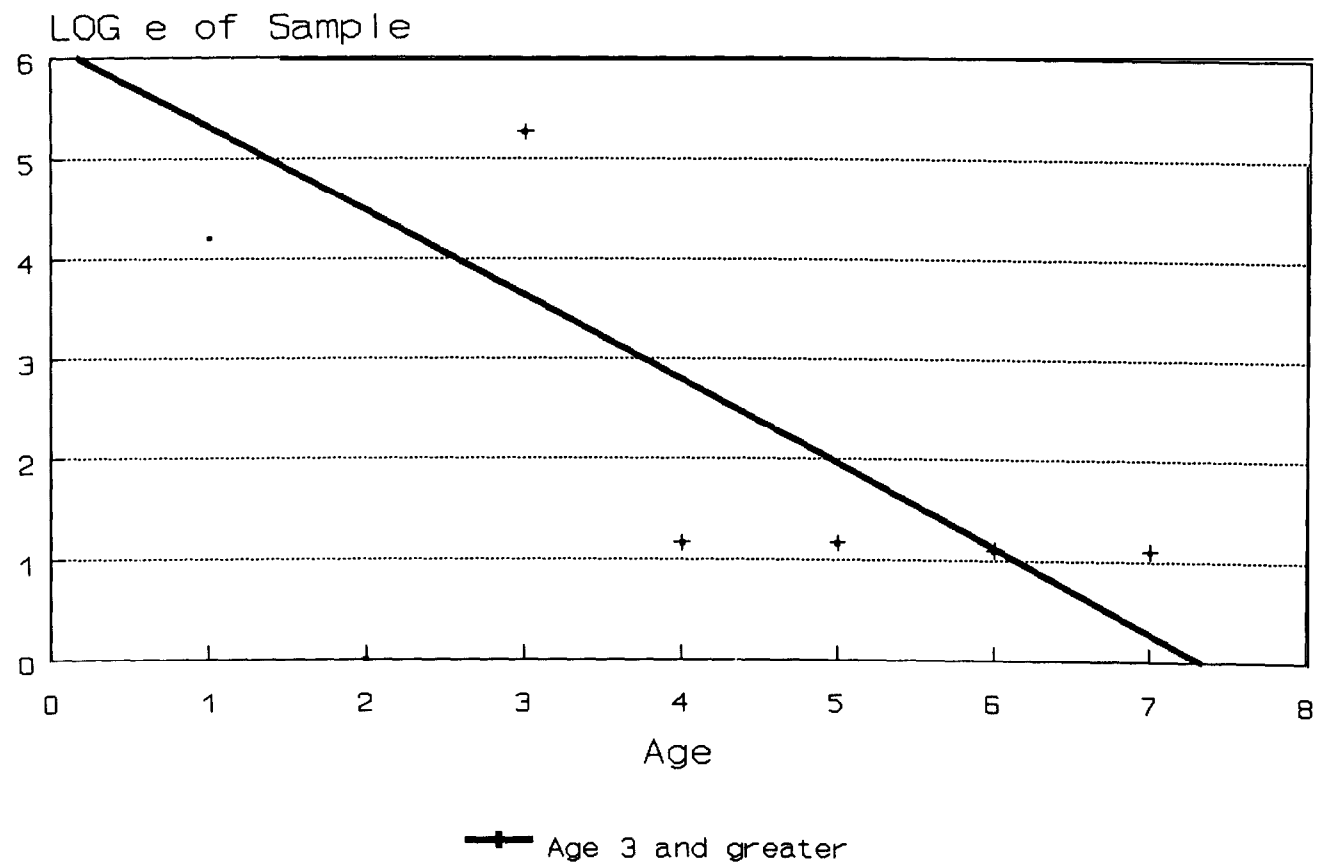
We collected 711 smallmouth bass from Waha Lake using electrofishing gear and 6 fish using rod and reel. Of the 717 smallmouth bass, 291 were 180 mm and larger (Figure 9). We tagged 263 smallmouth bass ranging from 180 mm to 305 mm with non-reward floy tags. We tagged 28 bass (305 mm and larger) with \$5 reward tags.

We conducted a test of floy tag retention and delayed mortality caused by collection and/or handling. Fifty-five smallmouth bass between 180 mm and 213 mm long were collected by electrofishing, handled for scale removal and length and weight measurement, and tagged. These fish were placed in a covered, floating net pen. After 48 hours, all fish were alive and all tags were retained. The fish were released following the evaluation.

Age And Growth

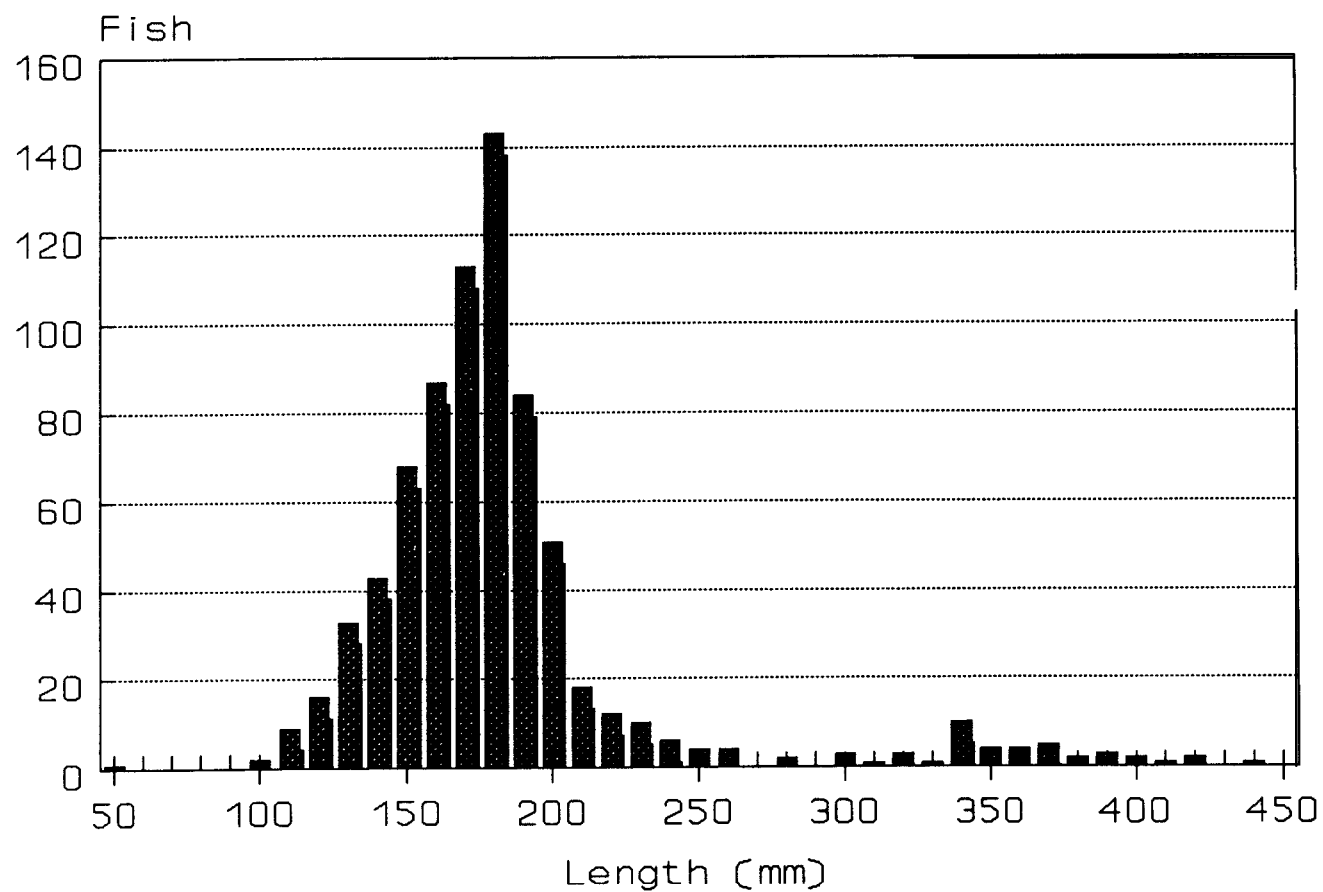
The length-weight relationship of smallmouth bass collected in Waha Lake (Figure 10) is defined by the equation:

$$W = 3.36 \times 10^{-6} (L^{3.228})$$



1990

Figure 8. Catch curve of age 3+ and older largemouth bass in Winchester Lake, from electrofishing, 1990.



n=717

Figure 9. Length frequency of smallmouth bass collected by electrofishing in Waha Lake. Bass were collected on May 8, 16, 31, June 6, and 12, 1990.

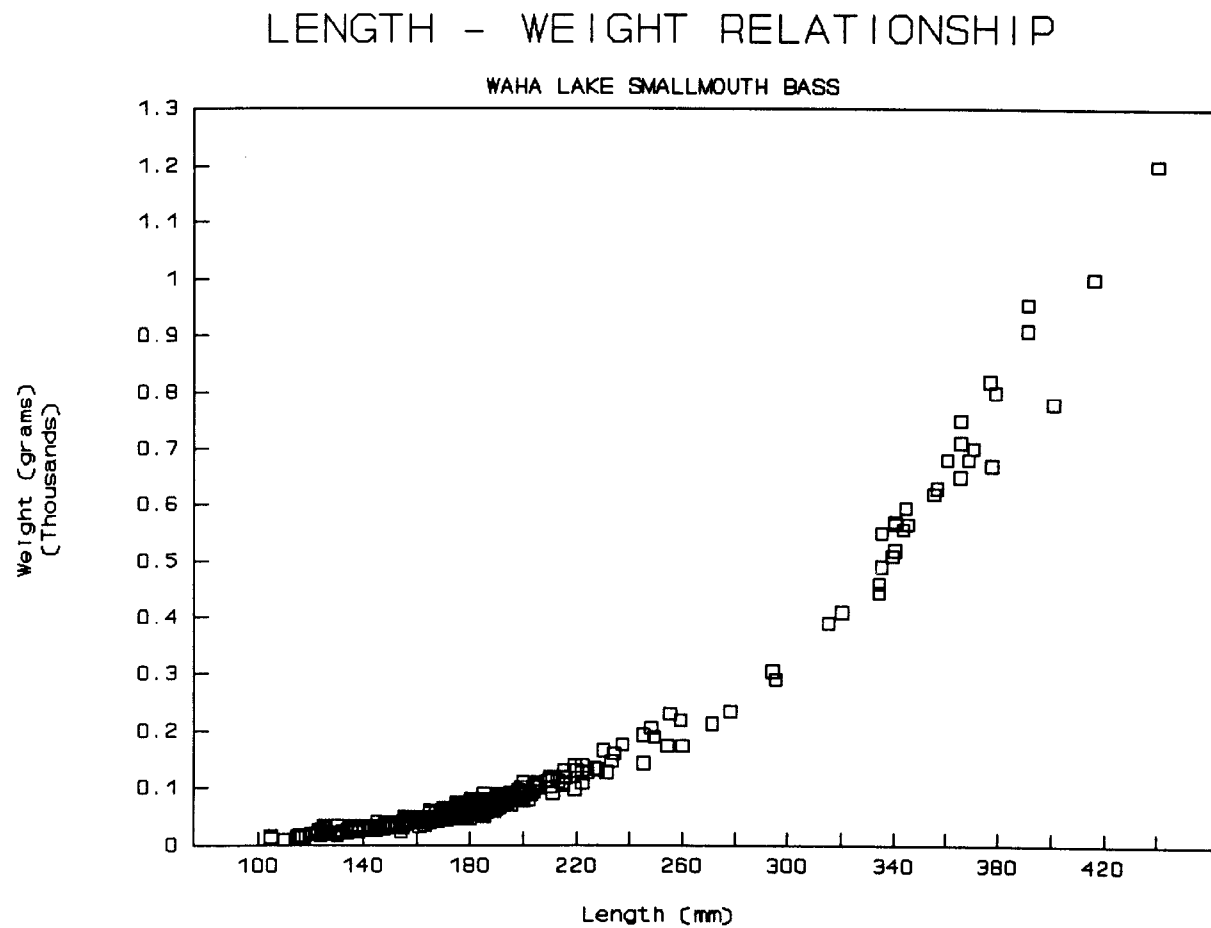


Figure 10. Length weight relationship of smallmouth bass in Waha Lake, 1990.

Length at age, back-calculated from scales taken from 103 smallmouth bass is shown in Figure 11. The body scale relationship is defined by the regression equation:

$$Y = 44.1 + 1.78X \quad (N = 103, R^2 = .94)$$

Length at age is similar to smallmouth bass populations in the Snake River below Hells Canyon Dam in 1985 (Lukens 1986). Length at age is smaller than smallmouth bass from Brownlee Reservoir on the Snake River above Hells Canyon Dam in 1983 (Rohrer 1985) (Figure 12). The majority of the electrofishing sample population consisted of age 3+ and 4+ fish (Figure 13). Sampling would indicate that bass 150 mm and larger were fully vulnerable to the electrofishing gear.

Population Status

PSD for the entire population sample was 9. PSD for individual sample days ranged from a low of 3 on May 8 to a high of 20 on June 6. The PSD of fish sampled on June 6 is probably the estimate that best fits the true population.

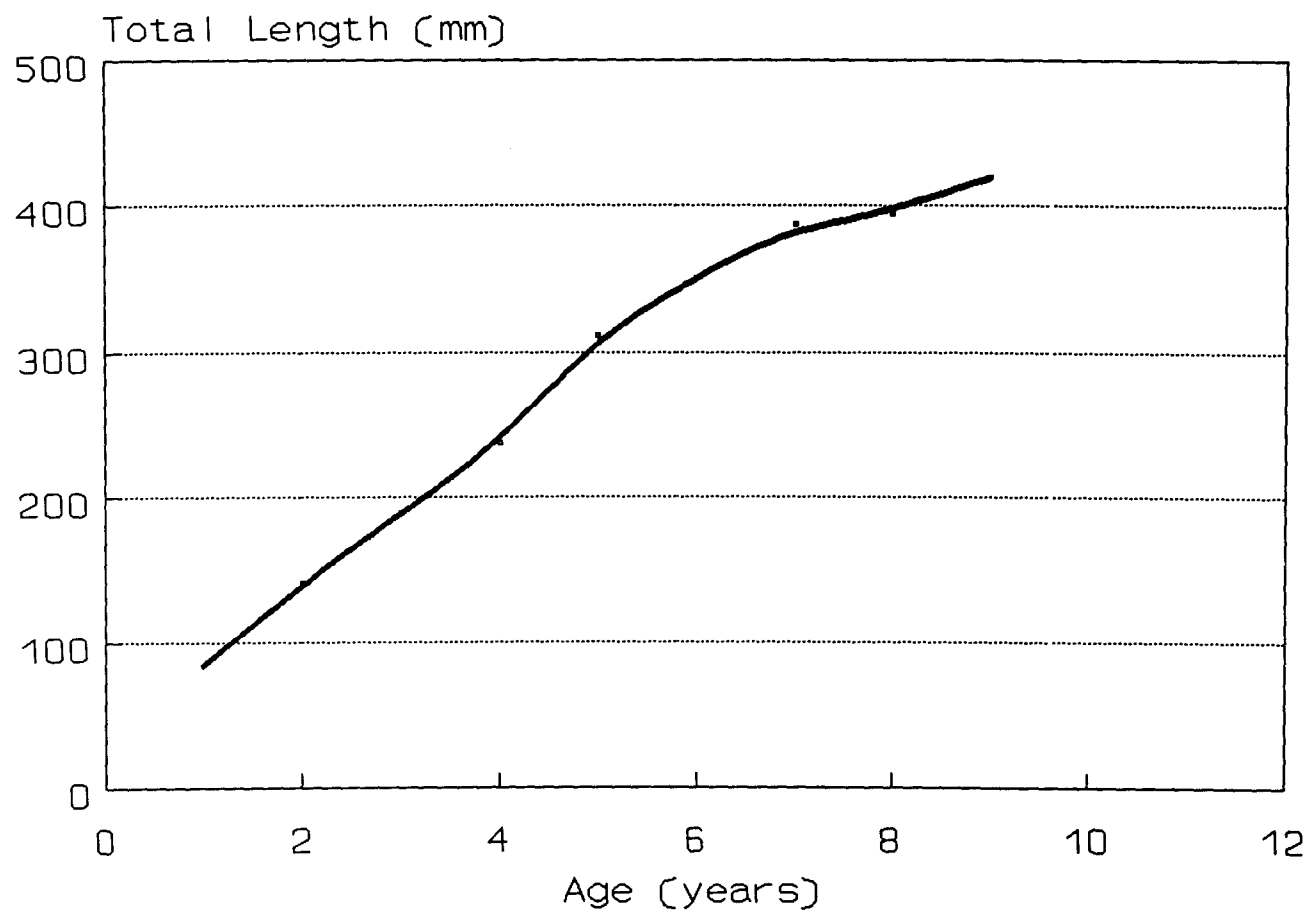
Relative weights for 50 mm length groups from 101 mm to 450 mm ranged from 77.9% to 99.0%. Fish smaller than 300 mm generally fell in the 80% range. Fish larger than 300 mm generally fell in the 90% range (Table 2). Fish from 300 to 400 mm long showed a higher relative weight than smallmouth bass sampled in the Hells Canyon reach of the Snake River (Lukens 1986). Comparatively, fish smaller than 300 mm had relative weights 19.8% to 12.9% lower than Hells Canyon bass.

The population estimate (Table 3) of bass over 180 mm long was 892 (95% CI = $602 \leq N \leq 1614$). The population estimate included only stock size (180 mm) and larger fish and assumed that this size range was fully vulnerable to the collection method.

Total instantaneous mortality (-Z) was estimated from a catch curve to be 1.034 (Figure 14). Angler exploitation (E) from reward tag returns was estimated at a minimum 3.6% (1/28), with a -Z value of 1.034 and E value of 3.6%, S = .355, A = .645, and F = .058 (Everhart and Young 1981).

Habitat Enhancement

We bundled stumps and root wads from mature trees with 3/8-inch steel cables and weighted the bundles with concrete anchors. Generally, bundles consisted of three to five stump/root wads. However, some large stumps were sunk separately. The stump bundles were placed in areas with water depths ranging from 6 to 40 feet.



n=103

Figure 11. Backcalculated length at age of smallmouth bass in Waha Lake, 1990.

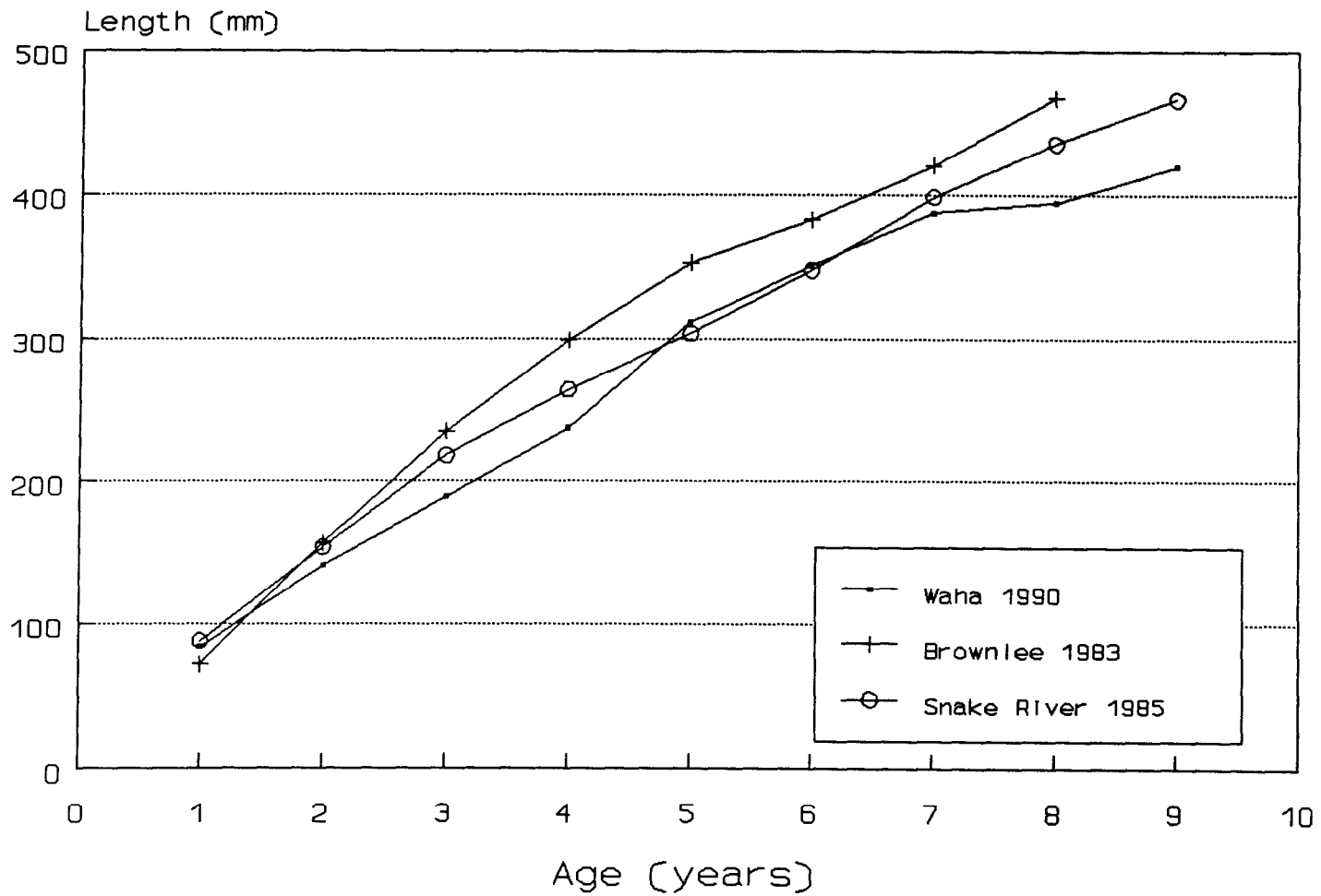


Figure 12. Comparison of backcalculated length at age of smallmouth bass in Waha Lake to other Idaho waters.

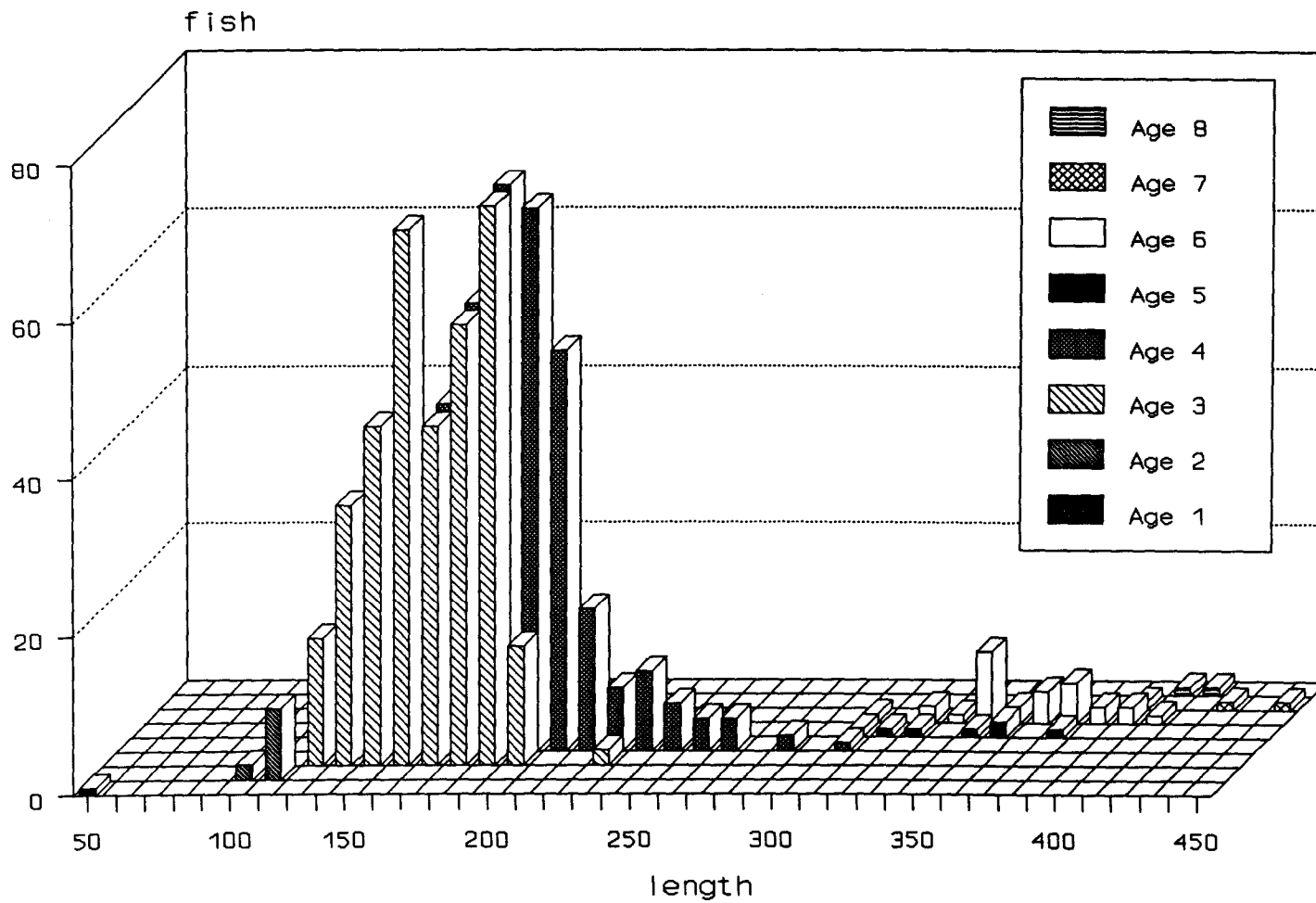


Figure 13. Age and size distribution of smallmouth bass in Waha Lake, 1990. N=749.

Table 1. Summary of marking and recaptures and population estimate worksheet for multiple census estimate of Winchester Lake largemouth bass population, 1990.

Number caught (Ct)	Recapt. (Rt)	Number marked	Marked at large (Mt)	CtMt	MtRt	CtMt^2	Rt^2/Ct
66	0	66	0	0	0	0	0
35	2	33	66	2,310	132	152,460	0.11
74	9	65	99	7,326	891	725,274	1.09
45	9	36	164	7,380	1,476	1,210,320	1.80
220	20	200	329	17,016	2,499	2,088,054	3.01
N = 4				s = 0.077581			
df = 3				s1/N = 0.000053			
t = 3.182				.95 ci 0.000170			
N mod Sch. 810				95% Confidence interval for 1/N			
N Schum 836				0.001367 (= 1/N =) 0.001025			
1/N = 0.001196				95% Confidence interval for			
s^2 = 0.006018				Schumacher's N			
				731 (= N =) 975			

Table 2. Comparison of relative weights, in 50 mm length groups, of smallmouth bass from Waha Lake and the Snake River below Hells Canyon.

Length (mm)	Waha Lake, 1990		Hells Canyon, 1985	
	Relative weight	Number of fish	Relative weight	Number of fish
101-150	79.8	110	94.6	99
151-200	77.9	292	97.7	110
201-250	83.4	41	96.3	87
251-300	80.8	9	93.9	85
301-350	93.8	14	90.2	72
351-400	99.0	14	94.7	12
401-450	97.1	2	109.3	1

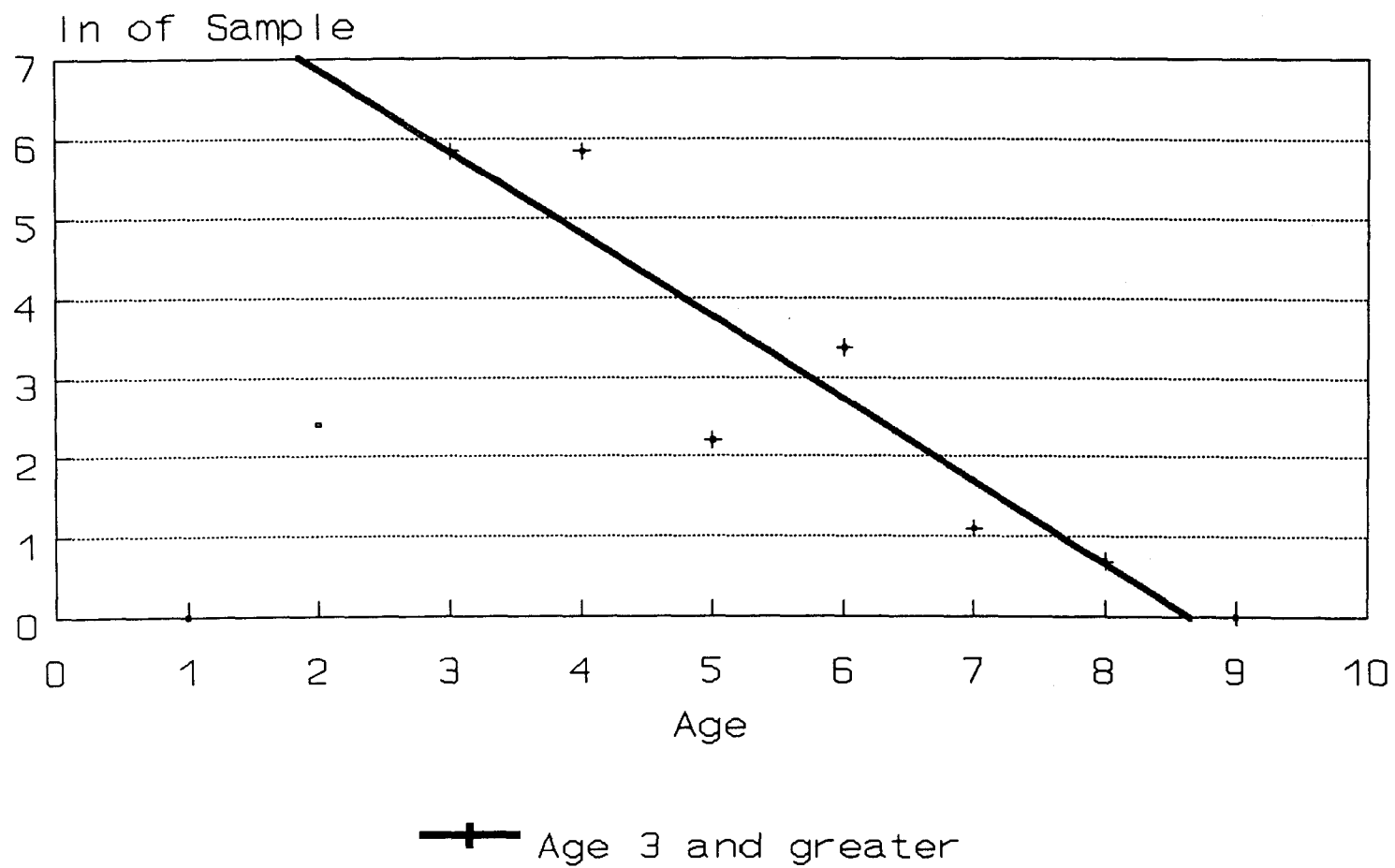


Figure 14. Catch curve for smallmouth bass age 3 and older from electrofishing in Waha Lake, 1990.

Fingerling Evaluations

Spokane strain rainbow trout fingerlings were stocked in Winchester and Mann lakes and Soldiers Meadow and Spring Valley reservoirs on May 16, 1990 (Table 4). Average size at stocking was 90 cm (55/lb). We sampled fish in the fall of 1990 to determine growth rates (Table 5) and relative abundance (Table 6). Sampling was done with variable mesh floating gill nets. All Spokane strain rainbow were marked with an adipose fin clip.

Spokane strain rainbow trout started contributing to angler's creels at approximately 150 mm. Many fish were returned because they were "too small." However, once fish reached 170 mm, few were returned. Fish stocked in Winchester, Mann, and Spring Valley had all achieved 180 mm before fall gill net sampling and had made considerable contribution to anglers' creels. In Winchester Lake and Spring Valley Reservoir, creel checks in August showed as high as 40% of the creeled trout were Spokane strain from the May stocking.

Spokane strain rainbow trout did not produce any significant contribution to anglers' creels in Mann Lake. Growth rate of gill net-caught Spokane strain rainbow trout from Mann Lake was the highest of all four lakes and indicates that Spokane strain rainbow trout would have been recruiting to the creel by late July.

Reduction of the pool level in Mann Lake subsequent to Spokane strain rainbow trout stocking is suspect in the apparent failure of Spokane strain rainbow trout stocking. The Lewiston Orchards Irrigation District (LOID) discovered failures in the dam structure and was ordered by the U.S. Bureau of Reclamation to reduce the pool volume by 30%, from 3,000 acre-feet to 2,000 acre-feet. This resulted in an 8-foot drop in elevation. Many fingerlings may have been lost in the evacuation. The pool reduction also eliminated all near-shore cover and concentrated trout fingerlings and largemouth bass in a reduced pool.

Spokane strain rainbow trout had not entered the fishery in Soldiers Meadow Reservoir prior to the gill net sample. They represented the highest relative abundance and the lowest growth rate. This would indicate a stocking rate of 337 fish/acre in a system with no predator to be too high.

Mann Lake

We sampled black crappie in Mann Lake in April 1990 with electrofishing gear. Crappie ranged from 115 mm to 265 mm long and represented three age classes (Figure 15). Back-calculated length at age is shown in Figure 16. We marked 107 crappie with a caudal notch on April 3. On April 4, we resampled Mann Lake checking 152 crappie. No recaptures were observed.

Table 3. Summary of marking and recaptures and population estimate worksheet for multiple census estimate of Waha Lake smallmouth bass population, 1990.

Number caught (Ct)	Recapt. (Rt)	Number marked	Marked at large (Mt)	CtMt	MtRt	CtMt^2	Rt^2/Ct
63	0	63	0	0	0	0	0
59	6	53	63	3,717	378	234,171	0.61
54	1	53	116	6,264	116	726,624	0.02
5	0	5	169	845	0	142,805	0
72	16	56	174	12,528	2,784	2,179,872	3.55
38	12	26	230	8,740	2,760	2,010,200	3.79
291	35	256	752	32,094	6.038	5,293,672	7.97
n =	6		s =	0.47			
df =	5		si/N =	0.0002			
t =	2.57		.95 ci	0.0005			
N mod Sch	892		95% confidence interval for 1/N				
N Sch	877		0.001661 (= 1/N =) 0.000619				
1/N =	0.001		95% confidence interval for Schumachers N				
s^2 =	0.22		602 (= N =) 1,614				

Table 4. Stocking summary of Spokane rainbow trout in Region 2 lowland lakes, 1990.

Water	Size (Acre)	Fish stocked	Stocking rate	Predator
Winchester	85	34,980	411/acre	largemouth bass
Mann ^a	145	60,003	414/acre	largemouth bass
Soldiers Meadow	100	33,706	337/acre	none
Spring Valley	54	25,025	463/acre	largemouth bass

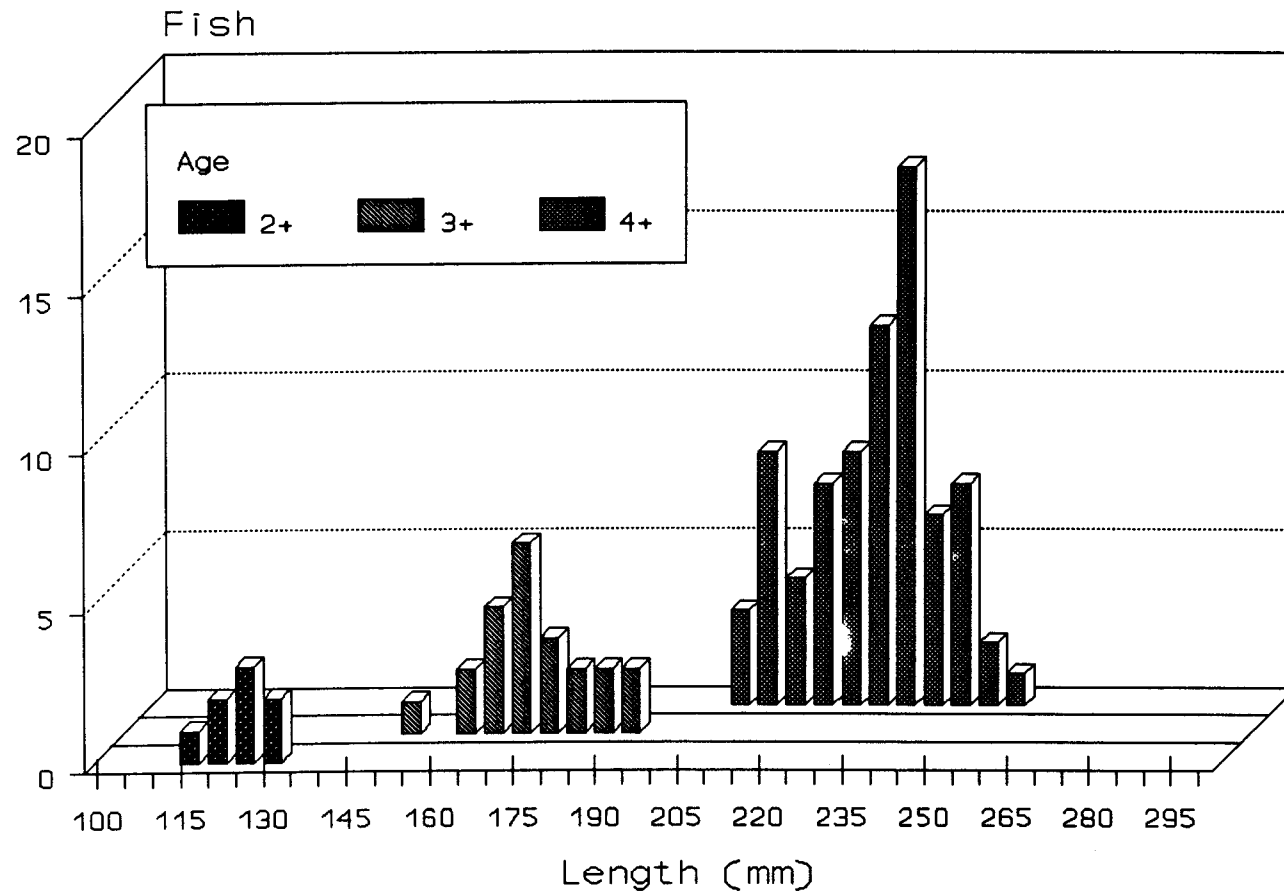
^aFull pool. Mann Lake was reduced to 90 acres 10 days following stocking.

Table 5. Growth of Spokane strain rainbow trout in Region 2 lowland lakes, 1990.

Water	Size at stocking (mml)	Size at recovery (mm)	Days in lake	Early growth (mm/d)
Winchester	90	198	110	.98
Mann	90	249	132	1.20
Soldiers Meadow	90	167	140	.55
Spring Valley	90	196	111	.95

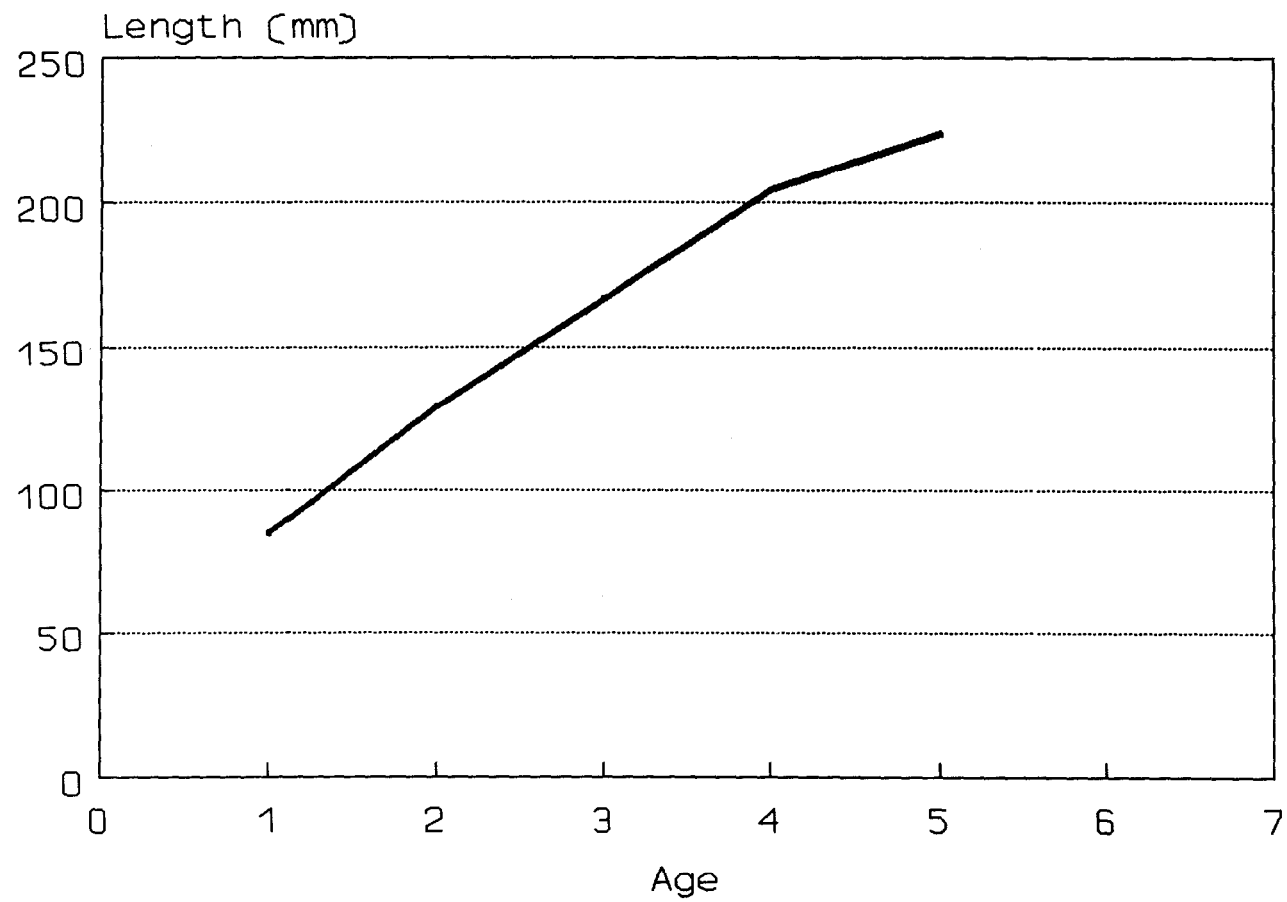
Table 6. Relative abundance of Spokane rainbow trout in Region 2 lowland lakes, 1990.

Water	Stocking #/acre	# Fish collected	# Net hours	Fish/ net hour	Predator
Winchester	411	37	34	1.09	largemouth bass
Mann	414	4	17	.23	largemouth bass
Soldiers Meadow	337	197	34	5.79	none
Spring Valley	463	7	17	.41	largemouth bass



April 1990

Figure 15. Length frequency and age distribution of black crappie in Mann Lake, 1990.



n=28

Figure 16. Backcalculated length at age for black crappie in Mann Lake, 1990.

DISCUSSION

Winchester Lake

Largemouth bass are relatively new to Winchester Lake. This is most likely the reason for few large fish. Environmental conditions are favorable for growth. However, year class failure, as evidenced by no age 2+ and 4+ bass in 1990 sampling, is probably related to environmentally-caused spawning failure. However, periodic reproductive failures may have a positive influence on growth rates by reducing competition between year classes of bass.

Angling pressure, bass exploitation, and fishing mortality of bass in Winchester Lake all appear to be low. This is most likely a result of a newly-established population and an undiscovered fishery. This will probably change with a strong year class of fish entering the legal size range (>12 inches) in the summer of 1991.

Age 3 and larger bass are foraging on brown bullheads and rainbow trout fingerlings. Trout fingerlings are stocked in late May at approximately 3 inches long. These fingerlings provide seasonal forage for bass throughout the summer growing season.

Population mortality estimates from the catch curve are not reliable in this example. Catch curves assume consistent recruitment. This may not be the case as entire year classes seem to be missing from the sample population. If age 4 fish were included (present) in the Winchester population, the estimate of Z would show a lower mortality rate. The PSD estimate would also indicate a more balanced population.

Waha Lake

Length frequency and age distribution of smallmouth bass in Waha Lake would indicate fairly constant recruitment level. The age distribution indicates that age 3+ bass may be suffering from mortality (angling) when they reach approximately 230 mm. The average length at age for an age 3+ (fourth year) bass from the back-calculation method is approximately 230 mm.

Angler exploitation estimates using reward tags on legal size (305 mm and larger) bass may prove an ineffective method if substantial harvest is occurring on sub-legal size bass. The increased mortality on age 3+ bass may also be diet-related as suggested by relative weight indices.

Kokanee

Late-spawning kokanee fry were not stocked in Waha Lake in 1989. Stocking rate was reduced from 300/acre in 1988 to 200/acre in 1990. Stocking rate reductions are being made to reduce densities of fish in an attempt to postpone average age at maturity from 2+ to 3+ and provide a larger fish in the fishery. Average size of kokanee in September 1989 was 219 mm (Schriever 1990). Average size of kokanee in September 1990 was 222.6 mm. Average size of kokanee sampled on April 10, 1990 was 207 mm. During the 153 days between sampling in 1990, kokanee length increased 15.6 mm.

RECOMMENDATIONS

1. Resurvey Winchester Lake largemouth bass in 1991 to determine if missing age 2+ and age 4+ were a result of sampling error or recruitment failure.
2. Model different size- and bag-related angling restrictions on Winchester Lake largemouth bass population. Present management options to public for input on possible quality or trophy management.
3. Pursue stricter enforcement and public education of the existing 12-inch minimum size restriction on smallmouth bass in Waha Lake.
4. Continue marked fingerling evaluation in Mann and Winchester lakes and Soldiers Meadow and Spring Valley reservoirs.
5. Reduce stocking rate of Spokane fingerlings to 150/acre in Soldiers Meadow Reservoir.
6. Reduce stocking rate of late spawning kokanee in Waha Lake to 50/acre. Stock every other year.
7. Stock marked Spokane strain rainbow trout fingerlings in Waha Lake in late May to early June at 100/acre.
8. Continue stocking 2,500 8- to 10-inch long Lahontan cutthroat trout in Elk Creek Reservoir annually.

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JOB PERFORMANCE REPORT

State of: Idaho

Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project: F-71-R-15

Title: Region 2 Rivers and Streams
Investigations

Subproject: 2-c

Period Covered: July 1, 1990 to June 30, 1991

ABSTRACT

During the first week of August 1990, fisheries personnel snorkeled 27 transects in the mainstem Selway River between White Cap Creek and Race Creek. Cutthroat trout numbers declined to 10.5/transect from 17.1/transect in 1988. Approximately 19% of the cutthroat trout observed in 1990 were estimated to be greater than 305 mm (12 inches) in length.

Snorkeling transects were established in the Little North Fork of the Clearwater River. Cutthroat trout densities were found to be as consistently low as seen in 1988.

Two hundred catchable-size rainbow trout were tagged with \$5 reward tags and stocked in the lower Lochsa and Selway rivers. The estimate of the minimum return rate was 4.5% (9/200).

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Regional Fisheries Manager

Ed Schriever
Regional Fisheries Biologist

R290DJ2C

OBJECTIVES

1. Estimate return rate of catchable rainbow trout stocked in lower Lochsa and Selway rivers.
2. Develop five-year database on selected streams.
3. Evaluate hatchery-reared channel catfish planted in the Hells Canyon reach of the Snake River.

METHODS

Established snorkel transects in the Selway River were snorkeled to provide an annual index of relative numbers. In 1988, 9,180 hatchery-reared channel catfish were planted at Pittsburg Landing in the Hells Canyon section of the Snake River. All of these fish were adipose fin clipped.

During 1987-89, Department personnel tagged (Floy tags) 116 channel catfish ranging in total length from 30.6 cm to 54.4 cm (12.0 to 26.9 inches) in the Snake River.

A total of 40 transects were snorkeled in 1988 and 1990 in the mainstem Little North Fork from Minnesaka Creek upstream to Canyon Creek (Table 1). In addition, ten tributaries were snorkeled for fish densities in 1990. These surveys were the first to be conducted and will be used in combination with 1991 data to provide baseline information about fish populations in this drainage.

In the lower Lochsa and Selway rivers, we tagged 200 rainbow trout with \$5 reward floy anchor tags to estimate return-to-the-creel in the lower Lochsa and Selway rivers. We considered the tag return rates to be a minimum estimate of fish exploitation. Factors such as increased mortality of tagged fish, lost tags, or failure to return a captured tag negatively bias return estimates.

We stocked fish twice in each river, once on July 15, 1990, and again on August 16, 1990. The July 15 plants were 1,000 fish each and the August 16 plants were 1,500 fish each. We tagged a random sample of 50 fish from each plant. Lengths of all marked fish were recorded. The average size of marked fish was not noticeably different between plant dates or plant locations (Table 2.)

We scatter-planted fish throughout the lower 20 miles of both rivers. We posted signs at common information sites along both rivers. The signs included information on tagged fish and the tag return deposit boxes. We placed tag return drop boxes at the Selway Ranger Station and Three Rivers Resort in Lowell, Idaho. Drop boxes were locked and included information envelopes for tag deposit and angler data on tag number, fish size, catch location and date, angler name, and address.

Table 1. Summary of fish densities, determined by snorkeling, in the Little North Fork Clearwater River, 1988 and 1990.

Stream	Date	Relative Location	Fish densities/100 ²		
			Rainbow	Cutthroat	Total trout
Adair Creek	9/90	Lower stream section	1.14	0.0	1.14
	7/91	Lower stream section	0.0	3.67	3.67
Bear Creek	8/90	Lower stream section	24.5	0.0	24.5
Canyon Creek	8/90	Lower stream section	0.36	1.63	1.99
Foehl Creek	8/90	Lower stream section	0.45	2.26	2.71
	8/91	Lower stream section	6.78	0.56	7.24
Larkin Creek	8/90	Lower stream section	11.6	0.0	11.6
Montana Creek	9/90	Lower stream section	0.0	0.76	0.76
	7/91	Lower stream section	0.0	17.05	17.05
Rutledge Creek	9/90	Lower stream section	9.84	0.0	9.84
	7/91	Lower stream section	0.0	9.57	9.57
Sawtooth Creek	8/90	Lower stream section	2.80	3.92	6.72
	8/91	Lower stream section	0.0	0.0	0.0
Spotted Louis Creek	9/90	Lower stream section	1.81	5.42	7.23
	7/91	Lower stream section	0.0	21.3	21.3
Twin Creek	9/90	Lower stream section	0.0	0.0	0.0
	7/91	Lower stream section	0.0	10.79	10.79
Mainstem pools above Bear Creek	8/88	22 pools upstream to Canyon Creek	0.44	0.15	0.59
	8/90	9 pools upstream to Canyon Creek	0.71	1.14	1.85
	8/91	3 pools upstream of Foehl Creek	0.0	1.39	1.39
Mainstem pools below Bear Creek	R/88	9 pools downstream to Minnesaka Creek	0.16	0.18	0.34

Table 2. Length frequency distribution of rainbow trout tagged and stocked in lower Lochsa and Selway rivers in July and August, 1990.

Length (mm)	Total	Lochsa Jul 15	Selway Jul 15	Lochsa Aug 16	Selway Aug 16
140	1	1	0	0	0
145	1	0	1	0	0
150	0	0	0	0	0
155	1	0	1	0	0
160	0	0	0	0	0
165	0	0	0	0	0
170	4	2	2	0	0
175	0	0	0	0	0
180	0	0	0	0	0
185	1	1	0	0	0
190	2	1	1	0	0
195	7	1	5	0	1
200	7	1	1	2	3
205	30	3	5	15	7
210	20	7	2	5	6
215	24	6	5	6	7
220	18	7	1	7	3
225	16	6	4	2	4
230	18	3	5	5	5
235	14	3	4	3	4
240	5	3	1	0	1
245	8	1	3	2	2
250	7	3	2	1	1
255	4	0	3	0	1
260	5	0	4	0	1
265	0	0	0	0	0
270	0	0	0	0	0
275	0	0	0	0	0
280	0	0	0	0	0
285	2	1	0	0	1
290	0	0	0	0	0
295	3	0	0	0	3
300	2	0	0	2	0
Total	200	50	50	50	50
Ave. mm	220.1	216.6	219.3	219.0	225.6

RESULTS

Minimum estimated return was 4.5% (9/200). The average number of days at large for tagged fish was 30.6 (range 2 to 86 days). The average time at large for returns from the July 15 plant was 44.6 days and 13.0 days for the August 16 plant.

Three returns came from the Selway River and six returns came from the Lochsa River. Five tags were returned from the July 15 release and four tags were returned from the August 16 release. Six tags were returned by Idaho resident anglers and two were returned by non-residents (Table 3).

Hook and line sampling in May 1989 resulted in the capture of 29 channel catfish, 10 of which were marked by an adipose fin clip. The adipose fin-clipped catfish, from the 1988 plant of 9,180 fish, ranged in total length from 27.5 cm to 38.6 cm (10.8 to 15.2 inches).

None of the tagged channel catfish were returned by anglers during the 1987-90 fishing seasons.

Numbers of cutthroat trout counted in snorkel transects decreased in most sections of the Selway River during 1990 (Table 4). Overall, numbers decreased from 17.1 cutthroat trout per transect in 1988 to 10.5 cutthroat trout in 1990. Sections exhibiting the major decreases were from Bear Creek to Moose Creek (21.8 to 7.4) and from Halfway Creek to Three Link Creek (30.0 to 3.0) (Table 4). The percentage of cutthroat trout estimated to be greater than 305 mm (12 in) in snorkel transects showed an overall decrease (Table 5).

Personnel caught, measured, and released 816 cutthroat trout from White Cap Creek to Race Creek in 1990. These fish ranged from 119 mm to 415 mm (4.7-16.7 inches) in total length and averaged 261 mm (10.3 inches). In 1990, 30% of the cutthroat trout caught were over 305 mm (12 inches) compared to 24% in 1988 (Table 6). Comparison of cutthroat trout counted in snorkel transects and cutthroat trout caught by angling are given in Table 7.

Counts of juvenile steelhead trout decreased somewhat throughout the river sections sampled, even though three of four transects below Moose Creek showed higher numbers (Table 8).

As in previous years, juvenile chinook salmon numbers remained low in the mainstem Selway River transects. We counted a total of 13 juvenile chinook salmon in 27 transects. No adult chinook salmon were observed in the 1990 transects.

Mountain whitefish were less than in previous years (Table 9).

Table 3. Summary of reward tag returns on catchable trout stocked in lower Lochsa and Selway rivers, 1990.

Taa #	River	Size at stocking	Stocking date	Capture date	Days at large	Angler residency
R01003	Selway	260	Jul 15	Aug 4	20	R
R01026	Selway	256	Jul 15	Oct 9	86	NR
R01064	Lochsa	230	Jul 15	Sep 9	56	R
R01072	Lochsa	235	Jul 15	Sep 3	50	R
R01075	Lochsa	242	Jul 15	Jul 26	11	NR
R01093	Selway	235	Aug 16	Sep 15	30	UNK
R01163	Lochsa	226	Aug 16	Aug 18	2	R
R01172	Lochsa	205	Aug 16	Aug 28	12	R
R01188	Lochsa	300	Aug 16	Aug 24	8	R
				Ave.:	30.6 ^a	

^aAverage days at large for stocking date: Jul 15 = 44.6 days
 Aug 16 = 13.0 days

Table 4. Average number of cutthroat counted in snorkel transect in the Selway River (unroaded portion) from White Cap Creek to Race Creek 1973 to 1978, 1980, 1982, 1984, 1986, 1988, and 1990. (ND = no data)

Stream section	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990
White Cap Creek to Running Creek	4.2	3.4	6.8	7.2	10.8	7.4	13.2	11.2	11.0	15.2	13.3	6.75
Running Creek to Bear Creek	7.2	4.8	6.6	6.2	18.6	10.6	18.6	11.2	17.4	19.2	11.6	16.4
Bear Creek to Moose Creek	5.3	7.5	5.0	6.0	17.4	19.6	16.0	16.2	19.4	21.4	21.8	7.4
Weighted means: White Cap Creek to Moose Creek	5.6	5.2	6.1	6.5	15.4	12.5	16.2	12.8	16.3	18.8	15.7	10.4
Moose Creek to Halfway Creek	6.0	9.0	5.6	8.0	24.0	19.7	14.3	19.5	28.3	21.7	18.5	10.5
Halfway Creek to Three Links Creek	3.0	7.4	7.0	9.5	20.0	22.0	29.0	21.0	23.0	32.5	30.0	3.0
Three Links Creek to Jim's Creek	5.0	4.3	8.0	6.5	11.0	16.0	22.0	23.5	18.5	34.7	20.0	12.2
Jim's Creek to Race Creek	ND	2.5	1.2	5.7	7.5	3.5	12.3	18.0	14.0	14.5	14.8	11.0
Weighted means: Moose Creek to Race Creek	3.6	5.9	5.3	7.4	15.3	13.8	18.0	21.1	20.5	24.3	18.7	9.85

Table 5. Percent of cutthroat over 305 mm (12 inches) counted in snorkel transects in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973 to 1978, 1980, 1982, 1984, 1986, 1988 and 1990. (ND = No data)

Stream section	Percent over 305 mm (12 inches)											
	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990
White Cap Creek to Running Creek	9.5	16.7	11.8	22.2	22.6	16.2	13.2	8.9	15.9	21.3	24.5	29.6
Running Creek to Bear Creek	11.1	8.3	18.2	16.2	21.5	20.8	11.8	10.7	20.7	14.6	22.4	15.9
Bear Creek to Moose Creek	<u>34.4</u>	<u>15.5</u>	<u>8.0</u>	<u>25.0</u>	<u>25.0</u>	21.4	9.9	15.0	22.7	18.7	22.9	16.2
Overall percent:												
White Cap Creek to Moose Creek	18.9	12.7	13.0	20.6	21.8	22.3	11.5	12.0	20.6	17.8	23.2	15.6
Moose Creek to Halfway Creek	8.3	ND	3.6	17.5	12.5	13.6	18.6	17.9	22.1	22.7	21.6	9.5
Halfway Creek to Three Links Creek	19.0	16.2	19.0	26.3	17.5	15.9	17.2	23.8	26.1	22.7	26.7	33.0
Three Links Creek to Jim's Creek	23.3	5.8	12.5	38.5	27.5	25.0	27.3	22.3	28.4	24.0	23.7	16.3
Jim's Creek to Race Creek	<u>ND</u>	<u>10.0</u>	<u>50.0</u>	<u>11.8</u>	<u>26.5</u>	35.7		11.1	30.4	15.5	13.6	46.7
Overall percent:												
Moose Creek to Race Creek	17.3	8.0	13.0	21.3	18.9	19.4	17.6	19.9	29.7	21.9	21.0	19.6

Table 6. Percent of cutthroat trout by 50.8 mm (2 inch) size groups sampled in the Selway River by angling, 1975 to 1978, 1980, 1982, 1984, 1986, 1988, and 1990.

Length (mm)	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990
102 to 151	8.7	2.2	8.7	0.8	4.6	2.8	4.2	2.4	12.4	0.1
152 to 202	31.3	16.4	20.9	20.7	13.6	19.0	22.2	15.8	14.0	22.7
203 to 253	27.0	24.8	24.5	15.7	22.2	25.2	28.2	23.3	25.1	16.5
254 to 304	21.0	35.7	27.0	34.1	30.7	31.2	24.7	27.1	24.3	26.2
305 to 355	11.2	18.4	17.0	23.2	25.3	18.9	16.8	28.0	21.0	25.7
356 to 405	0.8	2.5	1.3	5.1	3.4	2.3	3.8	3.1	3.0	4.7
Over 405	ND	ND	0.6	0.4	0.2	0.6	ND	0.3	0.2	0.5
Total # of cutthroat measured	233	238	229	470	352	549	429	322	506	816

Table 7. Comparison of cutthroat counted in snorkel transects and cutthroat by angling in the Selway River between White Cap Creek and Race Creek, 1975 to 1978, 1980, 1982, 1984, 1985, 1988 and 1990.

Year	Counted in snorkel transects		Total CT measured	Caught by angling	
	Average # of CT counted/ transect	% of CT >305 mm in transects		Average CT total length (inches)	% of CT caught >305 mm
1990	10.5	19	816	10.2	31
1988	17.1	22	506	9.8	24
1986	21.5	20	322	10.4	32
1984	18.3	23	429	9.8	21
1982	16.1	16	549	10.0	22
1980	17.0	14	352	10.4	29
1978	13.0	19	470	10.3	27
1977 ^a	15.4	20	229	9.5	19
1976	7.1	21	238	10.2	22
1975	5.7	13	233	9.4	12
1974	5.5	10			
1973 ^a	4.4	18			

^aExtremely low flows

Table 8. Average number of juvenile steelhead counted in snorkel transect in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973 to 1978, 1980, 1982, 1984, 1986 and 1990.

Stream section	Percent over 305 mm (12 inches)											
	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990
White Cap Creek to Running Creek	1.2	1.1	5.0	4.0	0.8	3.6	5.0	7.4	10.5	5.5	3.8	4.0
Running Creek to Bear Creek	2.2	3.2	7.0	2.2	2.0	0.8	3.4	6.0	14.4	3.8	4.4	4.0
Bear Creek to Moose Creek	4.3	3.7	11.0	13.0	3.3	3.4	9.0	19.8	17.2	11.8	18.2	15.6
Weighted means:												
White Cap Creek to Moose Creek	2.7	2.6	7.7	5.7	1.9	2.6	5.9	11.1	14.3	7.1	9.1	8.4
Moose Creek to Halfway Creek	27.5	17.8	17.8	13.2	5.3	22.0	9.7	40.3	43.8	23.7	22.5	34.3
Halfway Creek to Three Links Creek	14.0	17.4	25.3	19.5	9.5	12.0	19.0	28.0	31.0	21.0	35.0	42.0
Three Links Creek to Jim's Creek	19.3	8.8	32.5	23.5	24.7	18.7	18.9	24.2	26.7	28.7	31.8	41.0
Jim's Creek to Race Creek	1.8	6.2	6.7	4.3	10.5	5.8	9.8	10.0	13.0	15.0	12.3	3.3
Weighted means:												
Moose Creek to Race Creek	15.8	12.8	19.2	13.8	12.0	14.9	13.5	29.6	28.1	21.6	23.2	22.5

Table 9. Average number of whitefish counted in snorkel transects in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973 to 1978, 1980, 1982, 1984, 1986, 1988, and 1990.

Stream section	Percent over 305 mm (12 inches)											
	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990
White Cap Creek to Running Creek	35.2	31.1	8.4	17.8	32.8	9.4	15.8	18.8	23.2	22.2	17.3	22.75
Running Creek to Bear Creek	39.2	36.4	15.0	6.5	77.8	17.4	17.6	21.2	37.4	30.6	24.2	36.8
Bear Creek to Moose Creek	<u>31.1</u>	<u>34.2</u>	<u>11.8</u>	<u>9.0</u>	<u>51.3</u>	<u>16.6</u>	<u>19.0</u>	<u>30.2</u>	<u>44.2</u>	<u>31.6</u>	<u>29.6</u>	<u>10.2</u>
Weighted means:												
White Cap Creek to Moose Creek	34.9	33.9	11.7	10.9	44.9	12.1	17.6	23.4	35.8	28.6	24.1	21.7
Moose Creek to Halfway Creek	48.8	31.5	32.4	16.6	69.5	40.3	32.0	43.8	46.2	41.0	44.7	47.3
Halfway Creek to Three Links Creek	17.7	31.4	27.0	16.0	65.0	67.0	27.0	47.0	60.0	38.5	70.0	12.0
Three Links Creek to Jim's Creek	23.8	19.0	41.0	19.5	49.7	46.0	33.3	59.0	50.0	50.7	35.0	27.3
Jim's Creek to Race Creek	<u>5.2</u>	<u>16.8</u>	<u>18.7</u>	<u>2.0</u>	<u>41.0</u>	<u>20.5</u>	20.0	21.0	32.5	19.7	22.3	8.8
Weighted means:												
Moose Creek to Race Creek	23.0	21.5	29.3	13.3	50.4	39.6	28.8	47.9	44.2	35.9	36.8	26.5

DISCUSSION

Rainbow trout in this evaluation averaged 220 mm (8.66 inches, 4.4 per pound). Fish size ranged from 140 mm to 300 mm and was normally distributed (Table 2). In this distribution, 34% (68/200) of the fish ranged from 230 mm to 300 mm.

Evaluation of return rate by size group indicates that fish smaller than 230 mm returned at a rate almost seven times lower than fish 230 mm to 300 mm long. Return rates on fish ranging from 230 mm to 300 mm long were three times higher than for fish smaller than 249 mm (Table 10).

Region 2 requests for catchable trout call for fish to average 250 mm long (9.88 inches, 3 per pound). Assuming fish stocked met the requested average size of 250 mm, it is reasonable to expect a length frequency distribution similar to Table 2, shifted 30 mm larger.

Using a shifted length frequency distribution corresponding to the requested size fish (average 250 mm), 91% (183/200) would be 230 mm and larger. A 10.3% return (Table 10) would return 19 fish, a 2.7 fold increase over the smaller fish used in this evaluation (220 m.m average length).

The cost-benefit analysis suggests that if larger fish do return at a higher rate, planting fish that average 250 mm long is 69% more cost effective than fish averaging 220 mm long (Table 11).

This is not to suggest that the 10.3% return, even as a minimum estimate, is adequate to justify continuing this stocking program. However, if the return rate based on size is a real relationship and would apply in a system where return rates were favorable, the same benefit ratio (69% reduction in cost per fish caught) would apply.

We recommend discontinuing the stocking program in the lower Lochsa and Selway rivers. We recommend adopting management options more suited for wild/natural trout management in these rivers.

RECOMMENDATIONS

1. Discontinue stocking catchable rainbow trout in lower Lochsa and Selway rivers. Manage for wild fish.

Table 10. Comparison of return rate, by size group, on reward tagged rainbow trout stocked in lower Lochsa and Selway rivers, 1990.

Size (mm)	Number stocked	Number returned	Percent return
140- 149	132	2	1.5
140- 239	164	5	3.0
140- 249	177	6	3.4
230- 300	68	7	10.3
240- 300	36	4	11.1
250- 300	23	3	13.0
140- 300	200	9	4.5

Table 11. Cost/benefit analysis of stocking \$1,000 of fish at average length of 220 mm and 250 mm with factored return rate of 10.8% on fish >230 mm and 1.5% on fish ≤229 mm.

#kg	(#lbs)	Average length	Fish/kg (fish/lb)	Number fish	# Fish >230 mm	10.8% return	# Fish <229 mm	1.5% return	Total Cost/fish fish (dollars)
454	(1000)	220	9.7/(4.4)	4,400	1,496	154	2,904	44	198 5.05
454	(1000)	250	6.6/(3.0)	3,000	2,730	281	270	4	285 3.51

JOB PERFORMANCE REPORT

State of: Idaho

Name: REGIONAL FISHERY MANAGEMENT
INVESTIGATIONS

Project: F-71-R-15

Title: Region 2 Rivers and Streams
Investigations

Subproject: 22=d

Period Covered: July 1, 1990 to June 30, 1991

ABSTRACT

Region 2 fish management personnel offered technical guidance to other agencies and private entities on timber sales, mining, stream channel alteration permits, hydropower development, and other proposed activities.

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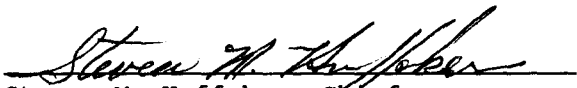
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